Class GB705
Book .C2L5

OFFICIAL DONATION.

GB 705
.C2 L5

Water-Supply and Irrigation Paper No. 81 Series M, General Hydrographic Investigations, 5

L44
3292
55

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

CALIFORNIA HYDROGRAPHY

BY

JOSEPH BARLOW LIPPINCOTT

WASHINGTON
GOVERNMENT PRINTING OFFICE
1903

PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

The publications of the United States Geological Survey consist of (1) Annual Reports; (2) Monographs; (3) Professional Papers; (4) Bulletins; (5) Mineral Resources; (6) Water-Supply and Irrigation Papers; (7) Topographic Atlas of United States, folios and separate sheets thereof; (8) Geologic Atlas of United States, folios thereof. The classes numbered 2, 7, and 8 are sold at cost of publication; the others are distributed free. A circular giving complete lists may be had on application.

The Bulletins, Professional Papers, and Water-Supply Papers treat of a variety of subjects, and the total number issued is large. They have therefore been classified into the following series: A, Economic geology; B, Descriptive geology; C, Systematic geology and paleontology; D, Petrography and mineralogy; E, Chemistry and physics; F, Geography; G, Miscellaneous; H, Forestry; I, Irrigation; J, Water storage; K, Pumping water; L, Quality of water; M, General hydrographic investigations; N, Water power; O, Underground waters; P, Hydrographic progress reports. Complete lists of papers relating to water supply and allied subjects follow. (B=Bulletin, PP=Professional Paper, WS=Water-Supply Paper.)

SERIES I—IRRIGATION.

WS 2. Irrigation near Phoenix, Ariz., by A. P. Davis. 1897. 98 pp., 31 pls. and maps.
WS 5. Irrigation practice on the Great Plains, by E. B. Cowgill. 1897. 39 pp., 11 pls.
WS 9. Irrigation near Greeley, Colo., by David Boyd. 1897. 90 pp., 21 pls.
WS 10. Irrigation in Mesilla Valley, New Mexico, by F. C. Barker. 1898. 51 pp., 11 pls.
WS 13. Irrigation systems in Texas, by W. F. Hutson. 1898. 68 pp., 10 pls.
WS 17. Irrigation near Bakersfield, Cal., by C. E. Grunsky. 1898. 96 pp., 16 pls.
WS 18. Irrigation near Fresno, Cal., by C. E. Grunsky. 1898. 94 pp., 14 pls.
WS 19. Irrigation near Merced, Cal., by C. E. Grunsky. 1899. 59 pp., 11 pls.
WS 23. Water-right problems of Bighorn Mountains, by Elwood Mead. 1899. 62 pp., 7 pls.
WS 32. Water resources of Porto Rico, by H. M. Wilson. 1899. 48 pp., 17 pls. and maps.
WS 43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls.
WS 70. Geology and water resources of the Patrick and Goshen Hole quadrangles, Wyoming, by G. I. Adams. 1902. 50 pp., 11 pls.
WS 71. Irrigation systems of Texas, by T. U. Taylor. 1902. 137 pp., 9 pls.
WS 74. Water resources of the State of Colorado, by A. L. Fellows. 1900. 151 pp., 14 pls.

The following papers also relate especially to irrigation: Irrigation in India, by H. M. Wilson, in Twelfth Annual, Part II; two papers on irrigation engineering, by H. M. Wilson, in Thirteenth Annual, Part III.

SERIES J—WATER STORAGE.

WS 33. Storage of water on Gila River, Arizona, by J. B. Lippincott. 1900. 98 pp., 33 pls.
WS 40. The Austin dam, by Thomas U. Taylor. 1900. 51 pp., 16 pls.
WS 45. Water storage on Cache Creek, California, by A. E. Chandler. 1901. 48 pp., 10 pls.
WS 46. Physical characteristics of Kern River, California, by F. H. Olmsted, and Reconnaissance of Yuba River, California, by Marsden Manson. 1901. 57 pp., 8 pls.
WS 58. Storage of water on Kings River, California, by J. B. Lippincott. 1902. 100 pp., 32 pls.
WS 68. Water storage in Truckee Basin, California-Nevada, by L. H. Taylor. 1902. 90 pp., 8 pls.
WS 73. Water storage on Salt River, Arizona, by A. P. Davis. 1902. 54 pp., 25 pls.

The following paper also should be noted under this heading: Reservoirs for irrigation, by J. D. Schuyler, in Eighteenth Annual, Part IV.

SERIES K—PUMPING WATER.

WS 1. Pumping water for irrigation, by Herbert M. Wilson. 1896. 57 pp., 9 pls.
WS 8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls.
WS 14. New tests of certain pumps and water lifts used in irrigation, by Ozni P. Hood. 1898. 91 pp., 1 pl.
WS 20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls.
WS 29. Wells and windmills in Nebraska, by E. H. Barbour. 1899. 85 pp., 27 pls.
WS 41. The windmill; its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls.
WS 42. The windmill, Part II (continuation of No. 41). 1901. 73-147 pp., 15-16 pls.

(Continued on third page of cover.)

Water-Supply and Irrigation Paper No. 81 Series M, General Hydrographic Investigations, 5

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

CALIFORNIA HYDROGRAPHY

BY

JOSEPH BARLOW LIPPINCOTT

WASHINGTON
GOVERNMENT PRINTING OFFICE
1903

Copy 2.

GB1105
.C2L5

THE LIBRARY
OF CONGRESS

CONTENTS.

	Page.
Letter of transmittal	9
Introduction	11
Relation of rainfall to run-off in California	14
Diagrams and tables	14
Statistics by basins	17
Sacramento River Basin	17
San Mateo Creek	18
Salt Springs Valley watershed	18
Stanislaus River Basin	19
Tuolumne River Basin	19
San Joaquin and King river basins	19
Mohave river	20
Cuyamaca reservoir watershed	20
Sweetwater reservoir Basin	20
Evaporation	20
Lake Tahoe	20
Reno, Nev	21
Sweetwater reservoir	22
Kern and Tulare counties	22
Clear Lake, Lakeport, Cal	31
Discharge tables	32
Aguilar Creek	32
Alameda Creek	32
Alder Creek	40
Aliso Creek	40
American River	40
Armas Creek	42
Armitas Creek	42
Arroyo Burro	43
Arroyo Carnero	43
Arroyo Grande	43
Arroyo Leon	43
Arroyo Seco	44
Bear Creek	46
Beams ditch	46
Bear River	46
Big Rock Creek	50
Williams River	50
Bloomington flume, San Bernardino County	50
Briscoe Creek, Glenn County	50
Burney Creek	50
Butano Creek	50
Cache Creek	51
Cajon Creek	53
Calaveras River	53
Caliente Creek	56
Calloway canal	59
Camp Carlton ditch, San Bernardino County	59
Canyada del Corral	60

Discharge tables—Continued. Page.
Canyada Lares ... 60
Canyada Refugio ... 60
Canyada Verde ... 60
Capitan Creek ... 60
Carpenteria Creek ... 61
Carson River ... 61
East Fork Carson River ... 61
West Fork Carson River ... 63
Cascade Creek, Tuolumne County ... 64
Cherry Creek, Tuolumne County ... 64
Chino Creek, Riverside County ... 64
Chowchilla Creek ... 65
City Creek ... 68
Cold Spring Canyon ... 68
Coldwater Creek ... 69
Colorado River ... 69
Colton and Colton Terrace, San Bernardino County ... 71
Convict Creek ... 71
Cosumnes River ... 72
Cow Creek, Tuolumne County ... 75
Cucamonga Creek ... 75
Daley ditch, San Bernardino County ... 78
Deer Creek ... 78
Dinsmore Creek ... 81
Dobbins Creek ... 81
Dos Pueblos Creek ... 81
Dry or Jackson Creek ... 82
East Riverside Water Company, San Bernardino County ... 85
Eaton Canyon ... 85
Eleanor Creek ... 85
Falls Creek ... 85
Fall River ... 85
Feather River ... 85
Ficay Creek ... 87
Fort Tejon Creek ... 87
Fresno Creek ... 88
Gage canal ... 90
Gato Creek ... 91
Gazoo Creek ... 94
Gorman Creek ... 94
Green Spot pipe line ... 94
Grindstone Creek ... 94
Gubernador Creek ... 94
Hat Creek ... 94
Haws and Talmage ditch ... 94
Honey Lake ... 94
House Creek ... 94
Kaweah River ... 95
Kern River ... 99
King River ... 109
Little Rock Creek ... 119
Lobetus Creek ... 119
Logsdon and Farrel ditch, San Bernardino County ... 120
Loma Abajo ... 120

Discharge tables—Continued. Page.
Lopez Creek 123
Los Angeles River 123
Los Flores Canyon 137
Lytle Creek 139
Mammoth Creek 148
Maria Ignacia Creek 148
Mariposa Creek 149
Mayberry Canyon 152
McCloud River 152
McIntyre ditch 152
McKenzie ditch 152
Meeks and Daley ditch 152
Merced River 152
Mill Creek (King River) 158
Mill Creek (Santa Ana River) 158
Mill Creek, Green Spot pipe line 163
Mill Creek (Stanislaus River) 163
Mill flume and pump, Riverside Water Company 163
Mission Creek 163
Mohave River 164
Mokelumne River 168
Mono Lake drainage 173
Niagara Creek 173
Owens River 173
Pacoima Canyon 174
Padaro Creek 174
Pallett Creek 174
Pasadena Mesa 174
Pastoria Creek 180
Pescadero Creek 181
Pilarcitos Creek 181
Piru Creek 181
Pit River 182
Plunge Creek 182
Pomponio Creek 182
Poso Creek 183
Purissima Creek 185
Putah Creek 186
Rabel dam ditch, San Bernardino County 186
Ranchero ditch, San Bernardino County 186
Red Hills developments 186
Redlands canal 186
Rincon Creek 186
Rubicon River 186
Riverside Water Company, Upper Canal 186
Sacramento River 186
Salinas River 199
Tributaries of Salinas River 202
Arroyo Seco 202
Nacimiento Creek 205
Burnett Creek 206
San Antonio Creek 206
San Lorenzo Creek 207
Salt Spring Valley 208

Discharge tables—Continued. Page.
San Antonio Creek 209
San Bernardino Valley 215
San Diemas Wash 225
San Fernando Creek 225
San Francisquito Creek 225
San Gabriel River 225
San Gregorio Creek 259
San Joaquin River 259
San Jose Creek 268
San Luis Rey River 274
San Mateo Creek 275
San Roqui Creek 276
Santa Ana River 279
Santa Barbara County 321
Santa Clara River 322
Santa Monica Creek 323
Santa Paula River 324
Santa Ynez River 324
Sawpit Creek 328
Sespe Creek 328
Shasta River 328
Snow Creek 328
Spring Valley Water Company 328
Stanislaus River 329
Stony Creek 340
Susan River 343
Sutter River 344
Sweetwater River 344
Tecolote Creek 357
Tejon Creek 357
Tejon House Creek 357
Temescal Creek 358
Toro Canyon 360
Trabuco Creek 360
Truckee River 360
Tule River 374
Tumitus Creek 380
Tunis Creek 381
Tuolumne River 381
Twin Creeks 400
Walker River 401
Ward & Warren ditch 402
Warm Creek 402
White Creek 403
Whitewater River 406
Whiting ditch 407
Willow Creek 407
Yuba River 407
Maximum flood measurements 410
Weir tables 412
Rainfall tables 420

ILLUSTRATIONS.

	Page.
PLATE I. Map of California	12
FIG. 1. Diagram showing increase of rainfall with rise in elevation over the Sierras in central California	16
2. Annual and mean run-off from California watersheds, based on several years' observations	17
3. Map showing location of wells near Pasadena	175
4. Figure showing construction of weir	411

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
DIVISION OF HYDROGRAPHY,
Washington, D. C., January 15, 1903.

SIR: I have the honor to transmit herewith a paper entitled "California Hydrography," by Mr. J. B. Lippincott, containing a summary of as much of the data concerning the water supply of California as is available from printed records and from observations of other engineers and investigations made by this Survey. The published records on the subject, hitherto much scattered, some of them out of print and difficult to secure, are here brought together, and the paper should therefore form a convenient and valuable book of reference for the use of engineers, irrigators, and all who are interested in the development of the valuable water resources of California.

For convenience in the use of the book the prominent drainage basins have been placed in alphabetic order, and the minor tributaries of the larger streams have been arranged alphabetically under the name of the trunk stream into which they discharge. The minor tributaries and irrigation ditches have in addition been cross-entered in alphabetic place, so that they may be found independently under their local names. The discharge measurements include both low-water and flood records and are accompanied by useful precipitation data.

Very respectfully,

F. H. NEWELL,
Hydrographer in Charge.

Hon. CHARLES D. WALCOTT,
Director United States Geological Survey.

CALIFORNIA HYDROGRAPHY.

By Joseph Barlow Lippincott.

INTRODUCTION.

The purpose of this publication is to assemble under one cover as much of the data concerning the water supply of California as is available from printed records, observations of other engineers, and investigations made by this Survey. The greater portion of the data are obtained from the latter source. The records of stream flow that have been published by the United States Geological Survey appear, first, in numerous Water-Supply Papers, which are published annually, soon after the end of the year's work, and contain a brief summary of the past year's operations, and, second, in large annual reports, showing the average monthly discharge and other records of streams in all portions of the United States. Thus, while the published record is complete, it is distributed through many volumes, and numerous investigators do not have a complete set of these publications.

The methods of stream measurement practiced by the Geological Survey are fully described in Water-Supply and Irrigation Paper No. 56. In brief, they usually consist of measuring the cross section of the stream with a tape and a sounding rod, and determining the velocity at numerous points in this cross section by means of a current meter, usually of the Price type. On large streams the meter measurements are usually made from cables. On small streams they are often made from foot bridges. The velocity observed is applied to each subdivision of the cross section where it is made, and the aggregate discharge of these cross sections is taken as the total discharge of the stream. On small streams weir measurements are often made.

When a record of daily flow is to be kept on any river a gage rod is established on the stream near the point of measurement, and the height of the water on this rod is observed and recorded at the time each measurement is made. By properly selecting periods of high, low, and average water for the times of measurement it is possible to

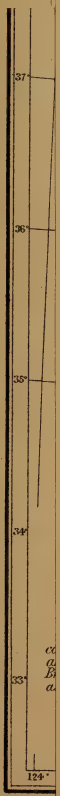
formulate a rating or discharge curve for the river in terms of volume discharged and water height on the rod. A local observer is employed to read the rod daily, and from these observed rod readings a statement of daily, monthly, and annual discharge is deduced.

Some of the data given were contributed by irrigation and power companies from daily records kept at their head works. In cases of this kind due credit is given.

The reports compiled and published by the California State engineering department between the years 1878 and 1884[a] are now out of print and hard to obtain. The information contained in them is therefore included in this paper. The method of stream measurement most commonly practiced by the State engineering department consisted of stretching two wires across the stream at a fixed distance apart and noting the time of passage of floats through the section observed from the upper to the lower wire. Cross-sectional areas were measured and the velocities indicated by the floats were applied thereto, thus determining the discharge. Daily records of river heights on gage rods were kept on a number of the streams in a manner similar to that practiced by the United States Geological Survey. A rating table for the station was obtained from the discharge measurements, and, by applying it to the daily rod readings, monthly and annual discharge tables were determined. In several instances, however, where records have been kept on neighboring streams the State engineering department has prepared theoretical discharge estimates of other streams in the same locality by using the rate of run-off per square mile obtained from a measured stream and applying it in determining the probable run-off from the basin of a neighboring stream. In cases of this kind the discharge figures are marked with a star. In each instance the effort has been made to give the date of the measurement, the name of the observer, the volume discharged, and a description of the locality and stream.

The measurements have been grouped in the principal drainage basins, but it would obviously be impossible to adhere rigidly to this arrangement. For instance, all the streams of the San Joaquin Valley are, technically speaking, tributary to San Joaquin River, but it would be manifestly improper to include all the main rivers from the Sierras in this section under the head of San Joaquin River. The rule therefore has been adopted of giving each prominent drainage basin its place in alphabetic sequence; the minor tributaries of these large streams are then arranged alphabetically under the name of the trunk stream into which they discharge. For instance, Tuolumne River is considered an independent stream, but Eleanor Creek, Falls Creek, etc., are considered minor tributaries and are arranged under the heading "Tuolumne River." The effort has been made, however,

[a] No measurements were made by the California State engineering department subsequent to 1884, as the office was then discontinued.


37°
36°
35°
34°
33°
124°

JULIUS BIEN & CO. LITH. N.Y.

to cross-enter all these minor tributaries, so that they may be found independently under their local names, reference being made to the trunk stream into which they discharge.

Undoubtedly many measurements that are not available for this publication have been made for corporations and individuals by engineers of California. These data, if they could be obtained, would doubtless be of great value, and the suggestion is here made that it would be a public benefit to send this information to the United States Geological Survey, where it would be available for publication in subsequent bulletins of this nature.

The records of the Signal Service and Weather Bureau are also contained in annual reports extending over a long term of years, and the engineer who possesses a complete file of these publications is indeed fortunate.

The rain water which forms the source of the water supply for agriculture in California falls in large part upon the mountain ranges of the State. It is a well-known fact that within the State there are vast differences in rainfall with increase or decrease of elevation, particularly on the western slopes of the mountain ranges. Rainfall statistics have been compiled in great mass for the valley districts, where farming is actually carried on, but the engineer who is investigating plans for storage and power is much more interested in the rainfall of the mountains. An attempt has been made to include in this paper all available data relative to precipitation at the higher elevations. The Weather Bureau publishes its records of precipitation in calendar years, beginning with the 1st of January, which is the middle of the rainy season on the California coast. A record beginning on the 1st of January may show for that and following months conditions of excessive drought, while for the following November and December of the same calendar year it may give records of excessive rainfall, the result indicated for the calendar year being a mean rainfall, whereas there may have been a dry season followed by one of excessive precipitation. For this reason the rainfall records for the mountain districts have been classified in seasonal years, and it is believed that their presentation in this form will avoid for the engineer many laborious retabulations of results. Particular effort has been made to collect and present new data.

Each table of precipitation is accompanied with a statement showing the approximate position of the station and its elevation, as well as the authority for the record. These records are in part taken from the annual reports of the Weather Bureau and rearranged in seasonal instead of calendar years, as stated above. All the regular stations of the United States Weather Bureau are situated at relatively low elevations with the exception of Mount Tamalpais, but some voluntary observers report to the Weather Bureau from mountain sta-

tions. These observers use a variety of measuring devices. Some use glass graduates, with various-sized catchment cups, and some employ more primitive implements. The records of mountain precipitation, however, are so scarce that they are all given here, because it is believed that any information tending to throw light on this subject is of value.

All the records that are credited to the Southern Pacific Railroad were obtained from Mr. William Hood, chief engineer of the system. The rain gages used by the railroad company are small gages with 3-inch catchment cups, usually set on posts about 6 feet in height, and the observations are made by the local railroad agents. Their reports are sent in promptly to San Francisco and are there tabulated by a corps of clerks whose time is devoted entirely to this subject.

In many places in the high mountain districts, particularly at the greatest elevations, the gages have been lately furnished by the hydrographic branch of the United States Geological Survey. The gages used in these places are of the standard type, with an 8-inch measuring cup. Snow observations are made by melting the snow and reporting the resultant water.

RELATION OF RAINFALL TO RUN-OFF IN CALIFORNIA.

DIAGRAMS AND TABLES.

The accompanying diagrams and tables are presented as the result of a study of the available rainfall and run-off data for California watersheds.

As the run-off diagram was to be used in estimating the water supply available for various storage reservoirs for irrigation, it was thought best to represent the run-off in acre-feet per square mile. The majority of the discharge reports give the depth of run-off in inches. The accompanying table has been made for converting depth of run-off in inches to run-off in acre-feet per square mile, the following formula being used:

Depth of run-off in inches $\times (0.0833 \times 640) =$ run-off in acre-feet per square mile.

Table for converting depth of run-off in inches into acre-feet per square mile.

Depth of run-off.	Acre-feet per square mile.	Depth of run-off.	Acre-feet per square mile.	Depth of run-off.	Acre-feet per square mile.	Depth of run-off.	Acre-feet per square mile.
Inches.		*Inches.*		*Inches.*		*Inches.*	
0.01	0.533	0.26	13.867	0.51	27.200	0.76	40.533
.02	1.067	.27	14.400	.52	27.733	.77	41.067
.03	1.600	.28	14.933	.53	28.267	.78	41.600
.04	3.133	.29	15.467	.54	28.800	.79	42.133
.05	2.667	.30	16.000	.55	29.333	.80	42.667
.06	3.200	.31	16.533	.56	29.867	.81	43.200
.07	3.733	.32	17.067	.57	30.400	.82	43.733
.08	4.267	.33	17.600	.58	30.933	.83	44.267
.09	4.800	.34	18.133	.59	31.467	.84	44.800
.10	5.333	.35	18.667	.60	32.000	.85	45.333
.11	5.867	.36	19.200	.61	32.533	.86	45.867
.12	6.400	.37	19.733	.62	33.067	.87	46.400
.13	6.933	.38	20.267	.63	33.600	.88	46.933
.14	7.467	.39	20.800	.64	34.133	.89	47.467
.15	8.000	.40	21.333	.65	34.667	.90	48.000
.16	8.533	.41	21.867	.66	35.200	.91	48.533
.17	9.067	.42	22.400	.67	35.733	.92	49.067
.18	9.600	.43	22.933	.68	36.267	.93	49.600
.19	10.133	.44	23.467	.69	36.800	.94	50.133
.20	10.667	.45	24.000	.70	37.333	.95	50.667
.21	11.200	.46	24.533	.71	37.867	.96	51.200
.22	11.733	.47	25.067	.72	38.400	.97	51.733
.23	12.267	.48	25.600	.73	38.933	.98	52.267
.24	12.800	.49	26.133	.74	39.467	.99	52.800
.25	13.333	.50	26.667	.75	40.000	1.00	53.333

At the outset many difficulties presented themselves. The most serious one was that of obtaining measurements of rainfall at the higher elevations. The streams having the largest run-off, and on which discharge records had been kept, have their sources on the western slopes of the high Sierra Nevada, where there are few or no inhabitants above 7,000 feet, and consequently no observers of rainfall; but the valuable rainfall records of the Pacific Railway system along the line of railway from Sacramento to the summit of the Sierra Nevada at Railroad Pass offered a solution of this difficulty. In fig. 1 the mean rainfall and the elevation of the station are plotted as ordinates, and the distance inland of the station as abscissas.

The rate of increase of precipitation from Sacramento to Cisco, at the elevation of 6,000 feet, the point of maximum rainfall, seems to

be 0.6 inch per 100 feet of rise. The precipitation above the 6,000-foot point decreases with the elevation approximately at the rate of 0.4 inch per 100 feet of rise.

Fortunately, in Tuolumne River Basin, about midway between American and King river basins, there is another series of rainfall stations, including Lagrange, elevation 293 feet above sea level; Sonora, elevation 1,824 feet; Second Garrote, elevation 2,900 feet, and Crockers, elevation 4,453 feet. The mean rainfall of these stations, plotted as in the above diagram, indicates the rate of increase from Lagrange to Crockers to be 0.84 inch per 100 feet of rise. This rate of increase has been taken to hold good up to an elevation of 6,000 feet, and above this the rate of decrease of rise to be 0.4 inch per 100 feet to an elevation of 9,000 feet. Probably the rate of increase and

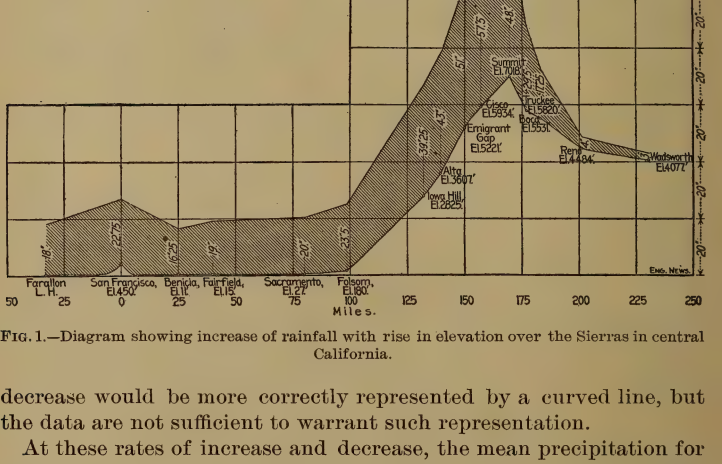


Fig. 1.—Diagram showing increase of rainfall with rise in elevation over the Sierras in central California.

decrease would be more correctly represented by a curved line, but the data are not sufficient to warrant such representation.

At these rates of increase and decrease, the mean precipitation for the years 1896–1899, at an elevation of 9,000 feet in the Tuolumne River Basin, would be 49.8 inches; if snow converts into water at the ratio of 8 to 1, the snowfall would be 33.2 feet at this elevation.

It was found impossible to use the run-off data of Kern River Basin—though that stream is without doubt more closely watched than any other stream in the State and the record is the oldest for any large stream in the State—because of the exposure of the watershed and because of the scarcity of rainfall data. This watershed is bounded on the west for almost its entire length by a high mountain range. Concerning the precipitation on the eastern slope of this range, little is known beyond the fact that it is very much less than on the western slope.

In 1896 the total run-off from King River Basin, comprising 1,775 square miles, was 1,871,005 acre-feet. For the same year the run-off from Kern River Basin was 619,630 acre-feet. The ratio of the area of King River Basin to Kern is 1 to 1.32, and the ratio of run-off, 1 to 0.33, though the higher drainage areas of the streams are contiguous. It was also thought best not to use the run-off and rainfall data for Piru Creek Basin, furnished by the Antelope Valley Water Company, because the ratio of discharge in acre-feet per square mile was greater than any other record. There is little doubt about the accuracy of both the run-off and precipitation records, the explanation being that the rainfall observation stations were necessarily situated at so low an elevation that the record did not represent the mean rainfall for the higher portions of the basin.

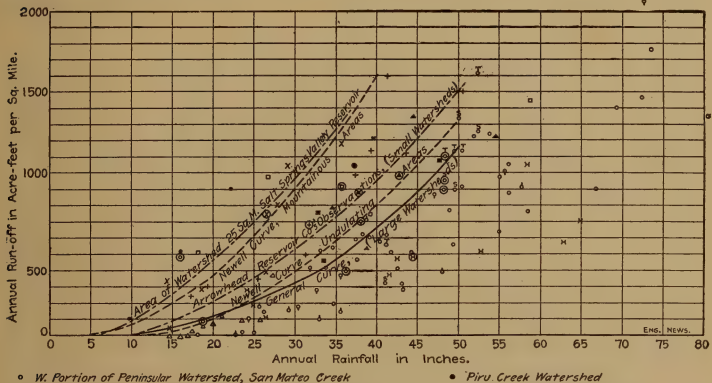


FIG. 2.—Annual and mean run-off from California watersheds, based on several years' observations.[a]

The run-off and rainfall data of the streams which were used to make the discharge diagram, fig. 2, will be mentioned in the order from north to south in which their watersheds occur.

STATISTICS BY BASINS.

Sacramento River Basin.—The rainfall stations used in determining the mean annual precipitation for Sacramento River Basin were the following: Red Bluff, Rosewood, Redding, Delta, Dunsmuir, Shasta, Sisson, and Fort Bidwell.

There were absolutely no records for the great interior mountain-

[a] For derivation of "Newell curves," see Nineteenth Ann. Rept. U. S. Geol. Survey, pt. 2, 1894, p. 151.

ous and lava country in Siskiyou, Modoc, and Lassen counties, comprising more than 5,334 square miles of the watershed.

Fort Bidwell is situated outside of the watershed, on the eastern slope of the mountains that form the boundary, and would probably have a less rainfall than Modoc County. The record was kept there for a period of twenty-two years, and the mean rainfall is 20.8 inches.

The average rainfall at Red Bluff for a period of twenty-three years was 23.9 inches; at Rosewood, for a period of six years, 25.63; at Redding, for twenty-four years, 35.69 inches. The precipitation at these three latter stations was taken to get the average for Sacramento Valley for the years 1896-1899, during which years run-off measurements were made at Jellys Ferry. The mean rainfall of Pit River drainage area (5,334 square miles), which has an average elevation of 5,000 feet, was taken to be the same as that of the Sacramento Basin above Red Bluff.

The average rainfall at Delta for a period of fourteen years was 62.39 inches; at Dunsmuir, for ten years, 57.16 inches; at Shasta, for six years, 53.26 inches; at Sisson, for ten years, 32.75 inches. The rainfall at these four stations was taken to obtain the mean rainfall for the mountainous area of the watershed for the years 1896–1899.

San Mateo Creek.—The Spring Valley Water Company's record of rainfall and run-off from the watershed of San Mateo Creek is without doubt the oldest record in the State, having been kept for thirty years. In the table given on page 390 of Water-Supply and Irrigation Paper No. 38 of the United States Geological Survey, no allowance has been made for evaporation from the surface of the reservoir; 20 per cent has here been added to the run-off as calculated from those tables to cover evaporation. The drainage basin of San Mateo Creek ranges in elevation from 250 to 1,800 feet, with an average of about 750 feet. The hills are undulating. There is a limited growth of timber on the northern slopes near the summit, but a large amount of brush covers other portions of the basin. On the southern slopes and crest the hills are frequently bare of brush, but are covered with grasses.

Salt Springs Valley watershed.—The basin of Salt Springs Valley is largely of red clay, which scantily covers a bed rock of granite and slate. The topography is undulating rather than mountainous, about 20 per cent of the total drainage area being valley land. There is little brush or timber in the valley, and only a scattered growth of oak and scrubby pine on the hills. To obtain the mean for the basin 10 per cent has been added to the rainfall for North Hill, 6 miles northwest of the dam. To obtain the total run-off for the basin 4,132 acre-feet have been added to the amounts given in the table on page 337, Part IV, of the Eighteenth Annual Report of the United States Geological Survey, to compensate for evaporation from the reservoir surface.

The methods of measurement of discharge from the reservoir are

very crude, and this may partly account for the very high percentage of run-off from this basin, which contains 25 square miles.

Stanislaus River Basin.—No rainfall data were obtained for this basin, but since it joins the Tuolumne and is in most respects similar to that, the rainfall for Tuolumne Basin has been taken to apply to both.

Tuolumne River Basin.—To obtain the mean rainfall for this basin the average elevations and the areas of the various portions were taken from the topographic maps of the United States Geological Survey. The areas were obtained by the use of a planimeter. La Grange was taken as the base station, and the percentage of increase for the various elevations is shown by the diagram, fig. 1. The following example, for the year 1896, will illustrate more particularly the method:

Table of estimated rainfall, Tuolumne River Basin.

Average elevation.	Number of square miles.	Estimated rainfall, 1896.	Mile-inches.
1,200	75	26.4	1,980
1,500	88	29.0	2,552
2,500	182	37.4	6,807
3,500	46	45.8	2,107
4,000	105	50.0	5,252
4,500	147	54.2	7,967
5,500	90	60.9	5,481
6,000	143	63.3	9,052
6,500	105	61.3	6,437
7,500	189	57.3	10,830
9,000	330	51.3	16,927
1,500	----------	----------	75,692

$\frac{75,692}{1,500} = 50.3$ inches mean for basin, 1896.

San Joaquin and King river basins.—There were practically no rainfall data for either San Joaquin or King River Basin.

The estimated mean rainfall for Tuolumne River Basin for the years 1896–1899 is 48.2 inches; the depth of mean run-off for the same period is 20.8 inches; the depth of mean run-off for San Joaquin River for this period is 18.4 inches. Since the topography, exposure, etc., in the two basins are similar, the rainfall will probably be proportional to the run-off.

Example, 20.8 : 18.4 : : 48.2 : 42.7. Similarly, the mean rainfall for King River Basin will be 37.8 inches.

Mohave River.—The meteorologic and hydrographic work of the Arrowhead Water Company has been carried on for a number of years at the head of Mohave River. Twenty-eight rain gages, carefully located at elevations of from 2,100 to 7,200 feet, have been maintained. The measurements of run-off from several tributaries have been made over weirs. The areas of the basins are each less than 50 square miles. The watershed is covered with a thick growth of timber on the crest. The growth of timber diminishes as the desert is approached, the northern part of the watershed being covered with brush only. The mean elevation of the watershed above sea level is about 5,250 feet.

Cuyamaca reservoir watershed—The area of this watershed is 11 square miles and the mean elevation above sea-level is probably 5,500 feet.

The run-off is carefully measured. There is only one rain gage maintained, and that is at the dam. The resident engineer, Mr. F. S. Hyde, says that as this rain gage is located between two high wooded peaks, which act as condensers of the moisture-laden clouds, the recorded precipitation is undoubtedly heavier than the average of the watershed. This probably explains why the mean annual run-off is so far below the general curve.

Sweetwater reservoir basin—The evaporation and run-off records from this basin date from 1888, and have been very carefully kept.

There is no doubt that many of the points on the curves (fig. 2) would be changed if we had more definite information as to the rainfall, but the curves are the best that could be made from the information at hand. The mean discharge for the period of observation on each stream is used, together with the mean rainfall for the same years. These means are considered the more satisfactory, as they tend to eliminate erratic stream and rainfall records.

EVAPORATION.

LAKE TAHOE.

On May 17, 1900, a galvanized-iron tank, 2 feet square and 2 feet deep, was placed in Lake Tahoe at its outlet, where it would be protected from the heavy waves of the lake, for the purpose of measuring the evaporation from the lake surface. A finely divided scale was placed in this tank, and daily readings taken at about the same hour of each day by Mr. J. U. Haley, general freight and passenger agent of the Lake Tahoe Railway and Transportation Company. The tank was at all times kept full to within 1 or 2 inches of the top, and was floated by means of a timber frame, which also served as a protection from waves and drift, so that the water level inside and outside was about the same. The depth of water in which the tank was anchored was about 6 feet, and the water in the tank was fully exposed to wind and

sun. The following table shows the monthly evaporation from May 17 to November 30.[a]

Evaporation at Lake Tahoe, as measured in tank in lake at Tahoe City.

Date.	Depth in inches.
1900.	
May 17 to 31	1.83
June	3.80
July	4.00
August	5.15
September	3.10
October	2.15
November	1.38
Total	21.41

While it is possible that the evaporation from the lake surface was somewhat greater than from the tank, owing to its greater roughness and consequent greater surface, relatively, in contact with the air during high winds, it is believed that the results here given are as near to the truth as it is possible to attain, and that they represent very closely the loss of water which may be expected from evaporation from natural lakes or storage reservoirs situated at about 6,000 feet altitude in this portion of the Sierras during the period over which the record extends.

RENO, NEV.

During the year 1894, from May 11 to November 30, a series of observations were made at Reno, Nev., with a view to determining approximately the depth of evaporation at that point. For this purpose a small galvanized-iron tank, 18 inches square and 18 inches deep, was sunk in the ground until the rim was but half an inch above the surface. This was kept filled to within less than 1 inch of the top at all times and was so placed that it was fully exposed to the sun and wind. The earth immediately around the tank was kept wet. The results, while not absolutely reliable as an index to the actual evaporation from a lake reservoir or canal surface, are believed to be a fairly close approximation to what would occur from such a surface at Reno, and since the conditions influencing evaporation—temperature, humidity of atmosphere, winds, etc.—over the lower portion of the Truckee River Basin are nearly identical with those at Reno, they should be roughly applicable to other points in that portion of the basin.

[a] Taylor, H. L., Water storage in the Truckee Basin: Water-Sup. and Irr. Paper No. 68, U. S. Geol. Survey, 1902.

Evaporation from tank in earth at Reno, Nev.

Date.	Depth in inches.
1894.	
May 11 to 31	2.80
June	5.35
July	8.45
August	9.12
September	7.44
October	4.31
November	2.75
Total	40.22

SWEETWATER RESERVOIR.

The following table shows the amount of evaporation, wind movement, humidity, and temperature at Sweetwater reservoir for a series of years:

Annual evaporation, temperature, etc., in Sweetwater Basin, San Diego County.

[Elevation of reservoir, 250 feet.]

Period.	Evaporation.	Wind.	Humidity.	Temperature of air.	Temperature of water.
	Inches.	*Miles per hour.*	*Per cent.*	°*F.*	°*F.*
1889–90	56.47	4.9			
1890–91	57.54	4.6			
1891–92	58.65	4.8	72	61	68
1892–93	49.60	4.9	68	61	67
1893–94	48.68	5.1	70	60	67
1894–95	46.31	5.2	79	59	
1895–96	45.18	5.2	71	61	
1896–97	[a]41.24	5.3	76	61	
1897–98	61.93	5.9	73	60	
1898–99	[b]32.54	5.8	72	59	

[a] Evaporation January 1 to August 31. [b] Evaparation September 1 to April 30.

KERN AND TULARE COUNTIES.[a]

To ascertain the amount of evaporation from exposed surfaces of water, experiments have been made in Kern County at various points, and in Tulare County at Kingsburg.

The experiments in Kern County commenced in the latter part of

[a] Authority, Physical Data and Statistics of California.

June, 1879, and were continued at several localities through July, August, and September, the three hottest months of the year. Subsequently observations were made until December 20, 1879, at Rio Bravo ranch, about 10 miles east of Bakersfield. The experiments at Kingsburg, Tulare County, commenced on November 1, 1881, and were continued to November 1, 1885.

In making the Kern County experiments pans of galvanized iron 2 feet square and 1 foot deep were used, some of the observations being made in pans floated in large bodies of water, and others in pans set in open ground, as will be explained more fully for each of the records.

The pans used in making the later observations at Kingsburg were 3 feet square and 15 inches deep. The water surface was maintained about 5 inches below the rim of the pan.

The amount of water required from time to time to maintain its surface in the pans at a fixed height was measured in standard cups prepared for the purpose and graduated to represent depth of water in the pan for which they were used.

When floated in a lake or river the pans were protected from the splash of waves. The contrivance used in King River, at Kingsburg, for this purpose was a large wooden frame, into which the pan was fitted so as to float horizontally, but not be protected from the sun or movement of the air.

Observers at Kingsburg were instructed, among other things—

To fill the pan to the normal plane once every day during the summer months; less frequently at other seasons of the year.

To take an observation at the commencement of every fall of rain, and to restore the water surface to the normal plane at the end of every fall of rain.

To keep a daily record of the temperature of the air, of the water in the pan, and of the water surrounding the pan.

To keep a rainfall record.

The earlier observations made in Kern County were conducted less systematically, but still with sufficient care and thoroughness to serve a good purpose.

The results of the observations made in Kern County are embodied in Tables No. 1 to 6, which are a rearrangement of data published by the State engineering department in the report of 1880.

In Table No. 1 are given the results of the experiment made in Reeder Lake, which is a narrow body of water, 12 to 15 feet deep, surrounded by large cottonwood trees and willows. The pan was placed in a shallow arm of the lake, fully exposed to the sun, but protected from the wind.

Panama Slough (see Table No. 2) was selected for another set of observations. The pan was placed in running water 10 feet deep, showing a much lower temperature than Reeder Lake. It was fully exposed to the sun, but protected from the wind.

The pan in the center of Kern Lake (Table No. 3) was about 2 miles from shore, in 5 feet of water. On September 5, 13, and 29 the wind was northwest; on September 19 it was southwest.

The pan near the shore of Kern Lake (Table No. 4) was placed on the northeast side of the lake, in about 2 feet of water.

In Tables No. 5 and 6 are given the results of observations made at the Rio Bravo ranch, 3 miles below the mouth of Kern River Canyon. The pan in Kern River was freely exposed to sun and wind, but was immersed in water to within 2 inches of its top. The pan placed on top of the ground was free to the action of all elements, producing extreme evaporation.

In Tables No. 7 to 11 are presented, in condensed form, the results of observations covering a period of four years. The total depth of water evaporated during each month, each period of three months, and each year is given in a separate table for each of the four years. The tables contain also the averages of daily temperature records.

Table No. 11 is one of averages, in which columns are added, showing the rate of evaporation per twenty-four hours, and the amount evaporated per second per square mile, during the different time periods.

The pan in the air referred to in the Kingsburg tables was, after the first three months, set into the ground, earth being banked up around its sides to the same elevation as the water in it. Its surface was fully exposed to sun and wind. During November and December, 1881, and January, 1882, this pan was on the railroad bridge, exposed on all sides to sun and air.

Evaporation at several points in Kern County, June to December, 1879.

TABLE NO. 1.—PAN IN REEDER LAKE.

Date.	Time of day.	Temperature (degrees F.).			Evaporation (depth in feet).	Evaporation per 24 hours (depth in feet).	Evaporation in cubic feet persecond persquare mile.
		Water in pan.	Water surrounding pan.	Air.			
1879.							
June 23	9.55 a. m.						
June 23 to 25	6.25 a. m.	83		92	0.040	0.0168	5.42
June 25 to 28	7.50 p. m.	81		90	.068	.0222	7.12
June 28 to 30	5 p. m.	82		79	.035	.0187	6.04
June 30 to July 5	4.50 p. m.	87		73	.096	.0192	6.20
July 5 to 8	5 p. m.	92		77	[a].072	[a].0240	[a]7.74
June 23 to July 8.					.311	.0203	6.56

[a] Water fell, leaving the pan at the top 6 inches above water surface.

Evaporation at several points in Kern County, June to December, 1879—Cont'd.

TABLE No. 2.—PAN IN PANAMA SLOUGH.

Date.	Time of day.	Temperature (degrees F.).			Evaporation (depth in feet).	Evaporation per 24 hours (depth in feet).	Evaporation in cubic feet per second per square mile.
		Water in pan.	Water surrounding pan.	Air.			
1879.							
July 9	12.30 p. m						
July 9 to 11	6.20 p. m	72		76	0.030	0.0134	4.34
July 11 to 21	9 a. m						
July 21 to 24	6.50 p. m			88	.037	.0108	3.48
July 24 to 29	6.15 p. m	76	71	88	.054	.0108	3.48
July 29 to August 5.	7 p. m	79	77	92			
August 5 to 13	7 a. m	72	74	76			
August 13 to 20	6.45 a. m	64	67	68	.084	.0120	3.87
July 9 to August 20.					[a].490	[a].0116	[a]3.74

[a] Approximate.

TABLE No. 3.—PAN IN CENTER OF KERN LAKE.

1879.							
August 30	10.40 a. m	88	86	90			
August 30 to September 5.	11.30 a. m	89	81	90	0.105	0.0175	5.63
September 5 to 13	12.30 p. m	86	86	118	.096	.0119	3.90
September 13 to 19	12.05 p. m	86	86	120	.150	.0250	8.08
September 19 to 29	12.10 p. m	78	78	88	.180	.0180	4.80
August 30 to September 29.					.531	.0173	5.70

TABLE No. 4.—PAN NEAR SHORE OF KERN LAKE.

1879.							
August 14	10.40 a. m						
August 14 to 30	10.40 a. m	88	86	90	0.480	0.0300	9.67
August 30 to September 5.	11.10 a. m	79	83	90	.201	.0334	9.31
September 5 to 13	12 m	88	90	118	.195	.0242	7.81
September 13 to 19	12 m	81	89	120	.156	.0259	8.36
September 19 to 29	12 m	76	80	88	.189	.0190	6.13
August 14 to September 29.					1.221	.0265	8.55

Evaporation at several points in Kern County, June to December, 1879—Cont'd.

TABLE NO. 5.—PAN IN KERN RIVER AT THE RIO BRAVO RANCH.

Date.	Time of day.	Temperature (degrees F.).			Evaporation (depth in feet).	Evaporation per 24 hours (depth in feet).	Evaporation in cubic feet per second per square mile.
		Water in pan.	Water surrounding pan.	Air.			
1879.							
October 2							
October 2 to 11	4 p. m.	66	64	74	0.104	0.0116	3.73
October 11 to 18	4 p. m.	68	66	84			
October 18 to 25	4 p. m.	68	66	78	.052	.0074	2.38
October 25 to November 1.	4 p. m.	62	61	67	.052	.0074	2.38
November 1 to 8	4 p. m.	55	55	63	.045	.0064	2.06
November 8 to 15	4 p. m.	56	56	62			
November 15 to 22	4 p. m.	54	54	64	.030	.0043	1.38
November 22 to 29	4 p. m.	53	53	68	.030	.0043	1.38
November 29 to December 6.	4 p. m.	52	52	54	.030	.0043	1.38
December 6 to 13	4 p. m.	50	50	54	.030	.0043	1.38
December 13 to 20	4 p. m.	52	52	54	.030	.0043	1.38
October 2 to December 20.					[a].408	[a].0052	[a]1.67

[a] Approximate.

TABLE NO. 6.—PAN ON OPEN GROUND AT THE RIO BRAVO RANCH.

1879.							
October 2	7 a. m.						
October 2 to 3	1 p. m.	68		94	0.037	0.0292	9.40
October 3 to 11	4 p. m.	68		74	.148	.0180	5.80
October 11 to 18	4 p. m.	80		84	.071	.0101	3.25
October 18 to 25	4 p. m.	78		78	.147	.0210	6.76
October 25 to November 1.	4 p. m.	70		67	.148	.0211	6.79
November 1 to 8	4 p. m.	58		63	.113	.0176	3.46
November 8 to 15	4 p. m.	65		62	.030	.0043	1.38
November 15 to 22	4 p. m.	64		64	.070	.0100	3.22
November 22 to 29	4 p. m.	62		68	.052	.0074	2.38
November 29 to December 6.	4 p. m.	58		54	.015	.0021	.68
December 6 to 13	4 p. m.	55		54	.037	.0053	1.71
December 13 to 20	4 p. m.	55		54	.037	.0053	1.71
October 2 to December 20.					.906	.0115	3.70

Evaporation at Kingsburg Bridge, King River.

TABLE NO. 7.—NOVEMBER 1, 1881, TO OCTOBER 31, 1882.

[Elevation 297 feet.]

Date.	Time of day.	Temperature of air.	Pan in river.			Pan in air.	
			Temperature of water in river.	Temperature of water in pan.	Evaporation (depth in feet).	Temperature of water in pan.	Evaporation (depth in feet).
1881.							
November	4.30 p. m.	66	56	55	0.220	60	0.335
December	4.30 p. m.	55	52	52	.050	55	.120
1882.							
January	4.30 p. m.	54	52	50	.090	53	.200
February	5 p. m.	56	55	54	.115	56	.105
March	5.15 p. m.	64	60	59	.180	66	.265
April	5.15 p. m.	73	63	62	.260	72	.435
May	5.45 p. m.	84	63	63	.305	77	.835
June	6.30 p. m.	88	67	68	.475	83	.940
July	6.30 p. m.	98	80	81	.660	91	1.075
August	6 p. m.	96	84	85	.665	85	.875
September	6 a. m.	81	73	73	.475	75	.575
October	10 a. m.	68	63	63	.135	60	.195
November to January.[a]					.360		.655
February to April[b]					.555		.805
May to July[c]					1.440		2.850
August to October.[d]					1.275		1.645
Total, November to October.					3.630		5.955

[a] First period. [b] Second period. [c] Third period. [d] Fourth period.

Evaporation at Kingsburg Bridge, King River—Continued.

TABLE No. 8.—NOVEMBER 1, 1882, TO OCTOBER 31, 1883.

Date.	Time of day.	Temperature of air.	Pan in river.			Pan in air.	
			Temperature of water in river.	Temperature of water in pan.	Evaporation (depth in feet).	Temperature of water in pan.	Evaporation (depth in feet).
1882.							
November	10 a. m.	53	52	52	0.115	49	0.100
December	10 a. m.	51	50	50	.085	46	.090
1883.							
January	10 a. m.	43	44	43	.060	41	.040
February	10 a. m.	54	50	49	.100	52	.070
March	10 a. m.	69	63	62	.305	60	.310
April	10 a. m.	67	61	62	.270	61	.260
May	10 a. m.	76	61	63	.160	67	.310
June	10 a. m.	92	68	71	.500	77	.850
July	10 a. m.	96	82	84	.760	78	.970
August	10 a. m.	93	82	83	.920	75	.970
September	10 a. m.	88	78	79	.730	73	.705
October	10 a. m.	69	62	62	.400	57	.290
November to January.[a]	10 a. m.	49	49	48	.260	45	.230
February to April[b]	10 a. m.	63	58	58	.675	58	.640
May to July[c]	10 a. m.	88	70	73	1.420	74	2.130
August to October.[d]	10 a. m.	83	74	75	2.050	68	1.965
Total, November to October.	10 a. m.	71	63	64	4.405	61	4.965

[a] First period. [b] Second period. [c] Third period. [d] Fourth period.

Evaporation at Kingsburg Bridge, King River—Continued.

TABLE No. 9.—NOVEMBER 1, 1883, TO OCTOBER 31, 1884.

Date.	Time of day.	Temperature of air.	Pan in river.			Pan in air.	
			Temperature of water in river.	Temperature of water in pan.	Evaporation (depth in feet).	Temperature of water in pan.	Evaporation (depth in feet).
1883.							
November	10 a. m	59	55	54	0.170	52	0.140
December	10 a. m	49	48	47	.080	44	.065
1884.							
January	9 a. m	47	48	48	.105	44	.075
February	9 a. m	52	52	52	.050	49	.060
March	9 a. m	61	56	57	.090	57	.105
April	9 a. m	67	60	61	.160	61	.180
May	9 a. m	76	59	61	.320	69	.400
June	9 a. m	77	57	60	.295	61	.505
July	9 a. m	83	61	63	.380	73	.670
August	9 a. m	78	64	66	.370	69	.670
September	9 a. m	75	63	63	.320	64	.520
October	9 a. m	68	62	63	.350	60	.310
November to January[a]					.355		.280
February to April[b]	9 a. m	60	56	57	.300	56	.345
May to July[c]	9 a. m	79	59	61	.995	68	1.575
August to October[d]	9 a. m	74	63	64	1.040	64	1.500
Total, November to October					2.690		3.700

[a] First period. [b] Second period. [c] Third period. [d] Fourth period.

Evaporation at Kingsburg Bridge, King River—Continued.

Table No. 10.—November 1, 1884, to October 31, 1885.

Date.	Time of day.	Temperature of air.	Pan in river.			Pan in air.	
			Temperature of water in river.	Temperature of water in pan.	Evaporation (depth in feet).	Temperature of water in pan.	Evaporation (depth in feet).
1884.							
November	9 a. m.	58	58	57	0.200	55	0.120
December	9 a. m.	50	48	47	.180	48	.140
1885.							
January	9 a. m.	48	50	49	.010	47	.010
February	9 a. m.	54	53	53	.140	51	.130
March	9 a. m.	65	60	60	.240	59	.220
April	9 a. m.	68	62	63	.160	63	.270
May	9 a. m.	75	63	65	.340	68	.660
June	9 a. m.	77	65	68	.660	71	.810
July	9 a. m.	84	72	74	.710	74	.900
August	9 a. m.	86	72	72	.930	72	.930
September	9 a. m.	79	74	74	.640	71	.660
October	9 a. m.	71	67	66	.470	63	.360
November to January.[a]	9 a. m.	52	52	51	.390	50	.270
February to April[b]	9 a. m.	62	58	60	.540	58	.620
May to July[c]	9 a. m.	79	67	69	1.710	71	2.370
August to October.[d]	9 a. m.	79	71	71	2.040	69	1.950
Total, November to October.	9 a. m.	63	62	63	4.680	62	5.210

[a] First period. [b] Second period. [c] Third period. [d] Fourth period.

Evaporation at Kingsburg Bridge, King River—Continued.

TABLE NO. 11.—NOVEMBER 1, 1881, TO OCTOBER 31, 1885.

[Average for four years.]

Date.	Pan in river.			Pan in air.		
	Evaporation (depth in feet).	Evaporation per 24 hours (depth in feet).	Evaporation in cubic feet per second per square mile.	Evaporation (depth in feet).	Evaporation per 24 hours (depth in feet).	Evaporation in cubic feet per second per square mile.
November	0.176	0.0059	1.89	0.174	0.0058	1.87
December	.099	.0032	1.03	.104	.0034	1.08
January	.066	.0021	.69	.081	.0026	.84
February	.101	.0036	1.16	.091	.0033	1.05
March	.204	.0066	2.12	.225	.0073	2.34
April	.213	.0071	2.29	.286	.0095	3.08
May	.281	.0091	2.93	.551	.0178	5.74
June	.483	.0161	5.20	.776	.0259	8.35
July	.628	.0203	6.54	.904	.0292	9.41
August	.721	.0233	7.51	.861	.0278	8.96
September	.541	.0180	5.82	.615	.0205	6.62
October	.339	.0109	3.53	.289	.0093	3.01
November to January [a]	.341	.0037	1.20	.359	.0039	1.26
February to April [b]	.518	.0058	1.88	.603	.0068	2.19
May to July [c]	1.391	.0151	4.88	2.231	.0243	7.83
August to October [d]	1.601	.0174	5.61	1.765	.0192	6.19
Total November to October	3.851	.0106	3.40	4.958	.0136	4.38

[a] First period. [b] Second period. [c] Third period. [d] Fourth period.

CLEAR LAKE, LAKEPORT, CAL.

Evaporation records have been kept by the United States Geological Survey at Lakeport, Cal., on Clear Lake, since February 1, 1901. The evaporation pan is 3 feet square and 1.5 feet deep, and is floated on a triangular raft anchored in a cove where it is not exposed to the full force of the wind. Evaporation observations were begun on the

land at the same point September 15, 1901. Capt. D. C. Rumsey is the observer. The following table gives the evaporation by months:

Evaporation record of Clear Lake, Lakeport, Cal.

1901.	Lake.	Land.	1902.	Lake.	Land.
January	[a] 0.85		January	0.85	0.85
February	.95		February	.25	.30
March	2.40		March	1.60	1.55
April	3.05		April	2.60	2.35
May	3.70		May	4.00	3.70
June	3.95		June	4.65	5.15
July	5.15		July	6.65	7.40
August	5.00		August	4.40	4.95
September	3.35	[b] 1.60	September	4.10	4.40
October	2.30	2.45	October	1.95	1.85
November	.85	1.05	November	.45	.45
December	1.30	.95	December	.40	.45
Total for period of observations.	32.85	6.05	Total for period of observations.	31.90	33.40

[a] Estimated. [b] September 15–29 only.

DISCHARGE TABLES.

The following tables, showing measurements of the discharge of California streams, are arranged alphabetically under the names of the streams considered.

AGUILAR CREEK.

Discharge measurement of Aguilar Creek.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Aug. —, 1899	G. F. Wright	.12	Santa Barbara County.

ALAMEDA CREEK.

Alameda Creek, in Alameda County, Cal., flows westerly into San Francisco Bay. The stream passes through narrows at Niles, where a weir dam known as the Niles dam is situated, and below this point spreads over certain absorbent gravel beds, at the lower end of which wells supplying considerable volumes of water are located. In the crest of the Niles dam is a rectangular weir opening. The length of this weir can be adjusted by inserting flash boards or planks. When the water reaches high stages it fills the rectangular weir opening

and flows over the top of the walls of the dam on the side, so that the large flood measurements that have been computed contain considerable elements of error. The measurements of smaller volumes, however, are doubtless more accurate. The Spring Valley Water Company, of San Francisco, has a pumping station which is supplied from an intake above the Niles dam, so that the amount of water pumped, as given in the following tables, should be added to the amount of water passing over the weir, in order to get total discharge.

During a term of years the Spring Valley Water Company kept observations at this weir dam of the height of water on the weir and the length of weir, and also of the amount of water pumped. These data were presented as Exhibit 11 in a certain suit entitled "Clough *v.* Crystal Springs Water Company of San Francisco," involving water rights to Alameda Creek, tried in the Alameda County superior court in the fall of 1901.

The record is not entirely complete, but the available data were assembled and computations of discharge were made by this office, and average monthly flow is given in the following tables. In some instances uncertainty exists as to the proper length of weir. This matter has been taken up, however, with the Spring Valley Water Company, and all corrections have been made for which the data are available. While the record is not considered perfect, it is the best obtainable, and in view of the extent of the data it is deemed to be worthy of publication.

Discharge measurements of Alameda Creek, Alameda County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Dec. 18, 1896	W. W. Brier	38.68	Niles dam.
Dec. 19, 1896	do	32.49	Do.
Dec. 20, 1896	do	30.94	Do.
Jan. 11, 1897	do	63.44	Do.
Jan. 12, 1897	do	57.25	Do.
Jan. 18, 1897	do	51.06	Do.
Dec. 18, 1896	do	7.74	3 miles below Niles.
Dec. 19, 1896	do	6.19	Do.
Dec. 20, 1896	do	.77	Do.
Jan. 11, 1897	do	44.87	Do.
Jan. 12, 1897	do	40.23	Do.
Jan. 18, 1897	do	34.04	Do.

Estimated monthly discharge of Alameda Creek at Niles dam.

Month.	Discharge over weir.			Quantity of water pumped.
	Maximum.	Minimum.	Mean.	
1889.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
January				12
February				11
March				8
April				13
May				13
June				12
July				11
August				7
September				5
October				7
November				8
December	2,577		996	4
The year				9.25
1890.				
January	7,792	412	1,664	2
February	2,813	237	1,007	
March	1,353	324	646	
April	412	176	242	
May	253	82	144	
June	88	41	62	
July	47	22	31	7
August	22	16	20	13
September	38	16	17	12
October	28	16	17	12
November	22	16	19	12
December	293	31	49	10
The year			326.5	5.7

Estimated monthly discharge of Alameda Creek at Niles dam—Continued.

Month.	Discharge over weir.			Quantity of water pumped.
	Maximum.	Minimum.	Mean.	
1891.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
January	165	38	58	9
February	3,311	38	457	10
March	3,965	98	424	5
April	253	84	147	10
May	79	47	60	12
June	47	22	32	12
July	19	2	9	12
August	2	0	2	12
September				10
October				10
November				10
December	1,701	0	84	10
The year			[a]159.1	10.17
1892.				
January	324	22	78	8
February	279	47	86	12
March	2,016	54	190	11
April	752	62	168	9
May	324	41	111	11
June	34	14	23	12
July	14	0	[b]4	12
August				9
September				6
October				6
November	3,566	599	[c]4,332	7
December	4,951	120	997	3
The year				8.8

[a] Eight months' mean.
[b] Mean of July 1 to 19, inclusive.
[c] Mean of November 28 to 30, inclusive.

Estimated monthly discharge of Alameda Creek at Niles dam—Continued.

Month.	Discharge over weir.			Quantity of water pumped.
	Maximum.	Minimum.	Mean.	
1893.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
January	2,016	120	437	6
February [a]	2,577	237	743	0
March				
April				
May				
June				2
July				12
August				12
September				9
October				8
November				8
December				7
The year			[b] 590	5.3
1894.				
January				3
February				
March				1
April				8
May				8
June				8
July				8
August				8
September				8
October				8
November				2
December 9 to 31	[c] 3,700	79	659	
The year				5.2

[a] No record for rest of year. [b] Two months mean. [c] No record prior to December 9.

Estimated monthly discharge of Alameda Creek at Niles dam—Continued.

Month.	Discharge over weir.			Quantity of water pumped.
	Maximum.	Minimum.	Mean.	
1895.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
January	4,521	200	1,221	.....
February	[a] 2,577	206	625	.....
March	224	125	170	.....
April	176	71	124	.....
May	224	54	92	.....
June	58	16	30	.....
July	16	3	10	[b] 4
August	3	1	1	12
September	[c] 2	2	2	12
October	47	0	8	12
November	14	3	7	12
December	25	6	9	12
The year	.....	.....	191.6	[d] 10.7
1896.				
January	2,936	6	534	6
February	306	75	118	.....
March	200	79	121	.....
April	2,577	79	336	.....
May	224	54	137	.....
June	54	16	29	7
July	16	2	5	12
August	2	1	1	12
September	4	1	1	12
October	23	0	3	12
November	25	4	8	10
December	872	12	81	8
The year	.....	.....	115	6.6

[a] Record missing February 15 to 28, inclusive.
[b] No record previous to July.
[c] Record missing September 16 to 30, inclusive.
[d] Six months mean.

Estimated monthly discharge of Alameda Creek at Niles dam—Continued.

Month.	Discharge over weir.			Quantity of water pumped.
	Maximum.	Minimum.	Mean.	
1897.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
January	565	47	123	
February	2,577	224	837	
March	3,700	246	816	
April	639	98	227	
May	98	58	71	
June	54	19	25	
July	[a] 19	12	16	
August				8
September				8
October				8
November	[b] 14	4	7	8
December	([c])			2
The year				2.8
1898.				
January				
February				8
March				9
April				12
May	[d] 4	2	2	12
June	[e] 4	0	0	12
July				9
August				7
September				8
October	(*f*)			10
November	0	0	0	11
December	2	0	0	11
The year				9.1

[a] Mean of July 1 to 15, inclusive. No record for remainder of month.
[b] No record from July 16 to November 15, inclusive.
[c] No record from December 1, 1897, to May 22, 1898, inclusive.
[d] No record from December 1, 1897, to May 22, 1898, inclusive.
[e] June 18 to October 22, inclusive, water below crest.
[f] No length of weir given from October 23 to November 18, inclusive.

Estimated monthly discharge of Alameda Creek at Niles dam—Continued.

Month.	Discharge over weir.			Quantity of water pumped.
	Maximum.	Minimum.	Mean.	
1899.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
January	431	0	41	8
February	4	0	2	11
March [a]				6
April	200	21	54	10
May	19	6	12	11
June	8	2	4	12
July	1	0	1	12
August	0	0	0	12
September				11
October				10
November	[b] 338	8	47	6
December	565	14	101	7
The year				9.67
1900.				
January	3,700	41	297	5
February	47	25	34	12
March	306	25	112	7
April	71	25	35	12
May	31	7	17	12
June	[c] 6	1	4	12
July	1	0	0	12
August	1	0	0	12
September	[d] 17	0	4	10
October				12
November				[d] 9
December				
The year				[e] 10.45

[a] Record incomplete.
[b] August 17 to November 15, inclusive, water below crest.
[c] No record from June 17 to 24, inclusive.
[d] End of record.
[e] Eleven months mean.

ALDER CREEK.

Alder Creek is a tributary of the Santa Ana, in San Bernardino County. (See Santa Ana River, Alder Creek.)

ALISO CREEK.

Aliso Creek rises in the Fernando hills. It is normally dry at the points of measurement. During the night preceding the measurements there had been 0.65 inch of rain. At the point of first measurement it is 1.5 miles from the foothills. The measurements show the manner in which the creek sinks. Just below the point of second measurement the water all disappears.

Discharge measurements of Aliso Creek, San Fernando Valley.

Date.	Hydrographer.	Discharge.	Locality.
1901.		*Sec.-foot.*	
January 28	J. B. Lippincott	0.60	At Chatsworth road crossing.
Do	do	.32	2 miles below road crossing.

AMERICAN RIVER.

Discharge measurements of American River, Sacramento County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Sept. —, 1898	J. B. Lippincott	34.5	Folsom.
Aug. 3, 1901	C. W. Landis	619	Do.
Sept. 18, 1901	J. B. Lippincott	23	Eldorado flume at Riverton.
Sept. 16, 1899	S. G. Bennett	86	Main river, 1 mile above South Fork.
Sept. 14, 1900	do	235	Do.
Sept. 16, 1899	do	20	North Fork ditch, 2½ miles above Folsom.
Sept. 14, 1900	do	12	Do.
Dec. 28, 1878	State engineering department.	570	4 miles above Folsom.
July 14, 1879	do	4,000	Do.
Jan. 24, 1879	do	13,000	Sacramento, Twelfth street bridge.
Feb. 23, 1879	do	10,000	Near mouth.
May 21, 1879	do	10,000	Do.

Discharge measurements of South Fork of American River, Eldorado County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. 21, 1902	S. G. Bennett	100	Chillie Bar, 3 miles from Placerville.
		5	Big Canyon Creek at Chillie Bar.
Aug. 22, 1902	do	12	South Fork of Silver Creek, 200 feet above mouth.
Do	do	30	Main Silver Creek, 150 feet above junction of South Fork of Silver Creek.
Aug. 23, 1902	do	30	Eldorado ditch, 1 mile from Pacific post-office.
Sept. 18, 1899	S. G. Bennett	[a] 20	South Fork at iron road bridge near mouth.
Sept. 14, 1900	do	80.5	Do.
Do	do	35	South Fork, Natoma ditch.
Sept. 18, 1900	do	[a] 20	Do.
Aug. 2, 1901	do	36	South Fork, Natoma ditch near Salmon Falls.
Sept. 13, 1901	J. B. Lippincott	[b] 28	Silver Creek below mouth of Little Silver.
Sept. 14, 1901	do	[c] 40	Do.
Sept. 13, 1901	do	[c] 25	South Fork at Riverton.
Sept. 18, 1901	do	[d] 16	Do.
Aug. 22, 1902	S. G. Bennett	11	Do.
Sept. 19, 1901	J. B. Lippincott	69	South Fork at Mosquito Bridge.
Aug. 19, 1902	Chas. A. Miller	7.5	Branch of Natoma ditch, South Fork of American River.
Do	do	40	Natoma ditch.
Aug. 22, 1902	do	29	Natoma ditch near Salmon Falls.
Do	do	7.9	Nigger Hill ditch near Salmon Falls.
Aug. 21, 1902	do	87	Iron bridge near mouth.
Aug. 23, 1902	do	102	2 miles above iron bridge.

[a] Estimated.
[b] 4.30 p. m.
[c] 8 a. m.
[d] 11 a. m. Flume company is said to be diverting entire river at their intake above Riverton, but considerable water returns to the river from leaks in old flume.

Discharge measurements of North Fork of American River.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Aug. 25, 1902	S. G. Bennett	59	200 feet above Colfax, Iowa Hill road bridge.
Do	do	35	South Yuba Water Company's new power canal.
Aug. 21, 1902	Chas. A. Miller	204	Above junction with South Fork.
Aug. 23, 1902	do	145	1 mile above mouth of South Fork.
Aug. 27, 1902	do	121	Do.
Aug. 28, 1902	do	78	2½ miles from Auburn above mouth Middle Fork.
Aug. 26, 1902	do	14	North Fork Canal, second crossing of ditch from Folsom.

Discharge measurements of Middle Fork of American River.

Date.	Hydrographer	Discharge.	Locality.
		Sec.-ft.	
Aug. 26, 1902	S. G. Bennett	25	North Fork of Middle Fork, 300 feet above junction.
Do	do	11	North Fork of Middle Fork, mining ditch.
Do	do	18	300 feet above junction with Rubicon River.
Do	do	42	Rubicon River, 300 feet above junction with Middle Fork of American River.
Aug. 28, 1902	do	110	Middle Fork above mouth.

ARMAS CREEK.

Discharge measurements of Armas Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Aug. —, 1889	G. F. Wright	0.08	

ARMITAS CREEK.

Discharge measurements of Armitas Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Aug. —, 1889	G. F. Wright	0.04	

ARROYO BURRO.

Discharge measurements of Arroyo Burro,[a] Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.23	
June 21, 1902	J. B. Lippincott	.0036	100 feet below Moore's north line.
June 17, 1900	J. Harrington	.03	San Roqui Creek, above tunnel.
Do	do	.03	San Roqui Creek, below tunnel.
May 2, 1900	do	.04	San Roqui Creek, station 6, opposite tunnel.
Do	do	.02	San Roqui Creek, station 8, opposite tunnel.
Do	do	.08	Tunnel of Pacific Improvement Co.
June 21, 1902	J. B. Lippincott	.009	San Roqui Creek, below tunnel.
Do	do	.25	Tunnel of Pacific Improvement Co.
Do	do	.011	San Roqui Creek at station 44, opposite tunnel.
Do	do	.0063	San Roqui Creek at station 65, opposite tunnel.

ARROYO CARNERO.

Discharge measurements of Arroyo Carnero, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.08	

ARROYO GRANDE.

Discharge measurements of Arroyo Grande, San Luis Obispo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Nov. 20, 1897	W. W. Brier	7.80	Arroyo Grande.

ARROYO LEON.

Discharge measurements of Arroyo Leon, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Oct. 17, 1893	W. W. Brier	0.63	½ mile above Half Moon Bar.

[a] The upper mountainous portion of this stream is called the San Roqui and the lower part the Arroyo Burro.

ARROYO SECO.

This stream is a tributary of Los Angeles River, which it joins at the city of Los Angeles. Its basin is small, draining 21 square miles of the Sierra Madre. The river issues from the mountains on the west side of Pasadena Mesa, passes through an opening in a granite spur known as Devils Gate, and joins Los Angeles River at Los Angeles. Between the point where the water issues from the mountain and Devils Gate lies a broad river bottom 2 miles in length, composed of coarse material. In passing over this the water sinks rapidly, diminishing in volume of flood water from the mouth of the canyon to Devils Gate. It is believed that a large portion of the underflow from the gravels above Devils Gate passes to the east of Devils Gate and flows toward the San Gabriel Valley. (See also Pasadena Mesa.)

Discharge measurements of Arroyo Seco, at cable station terminal quarries, Los Angeles County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Nov. 21, 1900, 1.30 p. m	E. P. Dewey	81
Nov. 21, 1900, 2 p. m	do	100
Nov. 21, 1900, 3 p. m	do	144
Nov. 22, 1900, 11 a. m	do	85
Nov. 22, 1900, 2 p. m	do	99
Nov. 23, 1900	do	31
Nov. 24, 1900, 3 p. m	do	11.5
Nov. 26, 1900, 3.45 p. m	do	8.7
Dec. 1, 1900	W. B. Clapp	4.3
Dec. 6, 1900	do	1.4
Jan. 6, 1901	do	7
Jan. 7, 1901, 9.30 a. m	do	172
Jan. 7, 1901, 3.45 p. m	do	103
Jan. 8, 1901	do	28
Jan. 11, 1901	do	14
Jan. 14, 1901	do	7
Jan. 20, 1901	do	5
Jan. 21, 1901	do	11
Jan. 23, 1901	do	7
Jan. 28, 1901	do	32
Jan. 29, 1901	do	11
Feb. 1, 1899	W. B. Clapp	.24
Mar. 17, 1899	do	3.24
Mar. 18, 1899	do	1.77
Mar. 19, 1899	do	.93
Mar. 20, 1899	do	2.52

Discharge measurements of Arroyo Seco, etc.—Continued.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Mar. 21, 1899	W. B. Clapp	1.90
Mar. 22, 1899	do	1.64
Mar. 23, 1899	do	1.56
Mar. 26, 1899	do	2.20
Mar. 28, 1899	do	1.22
Apr. 2, 1899	do	.28
Apr. 12, 1899	do	.08
Jan. 10, 1899	E. P. Dewey	3.02
Jan. 11, 1899	do	1.90
Jan. 12, 1899	do	2
Do	do	2.06
Nov. 20, 1900	do	.23
Nov. 21, 1900, 11 a. m	do	32
Nov. 21, 1900, 12 m	do	35
Nov. 21, 1900 1 p. m	do	75
Feb. 4, 1901	W. B. Clapp	29
Feb. 5, 1901, 11 a. m	do	869
Feb. 5, 1901, 3 p. m	do	410
Feb. 6, 1901	do	200
Feb. 9, 1901	do	102
Feb. 11, 1901	do	102
Mar. 16, 1901	do	17
Apr. 29, 1901	do	1.6
May 10, 1901	do	5.3

Discharge measurements of Arroyo Seco near Devils Gate, Los Angeles County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
June 14, 1899	T. D. Allen	[a]5.17
July 12, 1897	do	[a]5.12
Aug. 9, 1897	do	[a]4.63
Oct. 11, 1897	do	[a]4.13
Nov. 8, 1897	do	[a]4.16
May 31, 1899	do	[a]3.17
July 10, 1899	W. B. Clapp	[a]2.87
Sept. 17, 1900	do	[a]3.55
Sept. 16, 1898	F. H. Olmsted	[a]3.60
Oct. 12, 1898	J. B. Lippincott	[a]3.44

[a] Devils Gate developments, including Richardson and Wilson tunnels.

Discharge measurements of Arroyo Seco, Los Angeles County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Jan. 11, 1899	W. B. Clapp	4.17	Loughery dam site.
Oct. 13, 1898	J. B. Lippincott	.08	Painter pipe-line diversion.
Sept. 16, 1898	F. H. Olmsted	1.69	Sheep corral, total.
Oct. 24, 1898	J. B. Lippincott	1.48	Do.
May 29, 1899	W. B. Clapp	1.43	Do.
June 3, 1899	do	1.36	Do.
June 21, 1899	do	1.62	Do.
July 1, 1899	do	1.33	Do.
July 13, 1899	do	1.30	Do.
Sept. 19, 1900	W. W. Cockins, jr	1.94	Do.
Sept. 21, 1900	J. B. Lippincott	1.37	Do.
Feb. 6, 1901	S. G. Bennett	270	Avenue 26 bridge (flood measurement).

BEAR CREEK.

See Santa Ana, Bear Creek.

BEAMS DITCH.

See San Bernardino Valley, Beams ditch.

BEAR RIVER.

Discharge measurements of Bear River, Yuba County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Sept. 17, 1900	S. G. Bennett	11.7	Wagon bridge 1 mile south of Wheatland.
Dec. 16, 1878	State engineering department.	10	Wire bridge.
Sept. 6, 1879	do	15	Do.
Feb. 22, 1879	do	6,500	Do.
Sept. 6, 1879	do	15	Wheatland.
Oct. 20, 1879	do	12	1 mile below wire bridge.
Aug. 25, 1902	S. G. Bennett	16	Below waste from old mining ditch.
Do	do	33	Old mining ditch of South Yuba Water Company, one-fourth mile below head works.
Aug. 26, 1902	Charles A. Miller	28	Wooden flume of South Yuba Water Company, near Auburn.

Estimated monthly discharge of Bear River, Merced County, at base of foothills.[a]

[Drainage area, 166 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	0	0	0	0	0	0
December	0	0	0	0	0	0
1879.						
January	0	0	0	0	0	0
February	312	0	25	1,388	0.15	0.16
March	570	0	57	3,505	.34	.39
April	197	5	54	3,213	.33	.37
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	257	0	18	1,107	.11	.13
The year	570	0	13	9,213	.08	1.05
1880.						
January	217	0	25	1,537	.15	.17
February	700	0	61	3,509	.37	.40
March	85	10	31	1,906	.19	.22
April	2,080	25	321	19,101	1.93	2.15
May	47	0	23	1,414	.14	.16
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	421	0	115	7,071	.69	.80
The year	2,080	0	48	34,538	.29	3.90

[a] Authority, State engineering department.

Estimated monthly discharge of Bear River, etc.—Continued.

Month.	Discharge			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,920	20	169	10,391	1.02	1.18
February	1,423	47	214	11,885	1.29	1.34
March	197	13	48	2,951	.29	.33
April	20	0	6	357	.04	.04
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	0	0	0	0	0	0
The year	1,920	0	36	25,584	.22	2.89
1882.[a]						
January	0	0	0	0	0	0
February			33	1,833	.20	.21
March			100	6,149	.60	.69
April			130	7,736	.78	.87
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October			17	1,045	.10	.12
November			25	1,488	.15	.17
December			17	1,045	.10	.12
The year			27	19,296	.16	2.18

[a] Run-off for 1882, 1883, and 1884, estimated from previous measurements or from run off of neighboring streams.

Estimated monthly discharge of Bear River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1883.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			66	4,058	.40	.46
February			33	1,833	.20	.21
March			170	10,453	1.02	1.18
April			100	5,950	.60	.67
May			50	3,074	.30	.35
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	0	0	0	0	0	0
The year			35	25,368	.21	2.87
1884.[a]						
January			17	1,045	.10	.12
February			660	37,964	3.98	4.29
March			910	55,954	5.48	6.32
April			660	39,273	3.98	4.44
May			330	20,291	1.99	2.29
June			170	10,116	1.02	1.14
July			66	4,058	.40	.46
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0

[a] Run-off for 1882, 1883, and 1884, estimated from previous measurements or from run-off of neighboring streams.

BIG ROCK CREEK.

Discharge measurements of Big Rock Creek, Los Angeles County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec. feet.	
Jan. 4, 1898	J. B. Lippincott	5.27	Dam site above development tunnel.
Jan. 4, 1898	do	1.27	Diversion to tunnel.
Jan. 4, 1898	do	1.33	Developed in tunnel.
Jan. 4, 1898	do	.78	Cienega on Pallett tributary.

WILLIAMS RIVER.

Discharge measurement of Williams River, Yuma County, Ariz.

Date.	Hydrographer.	Discharge.	Locality.
		Sec. feet.	
Jan. 1, 1902	J. B. Lippincott	4	Mouth of river.
Oct. 28, 1902	E. T. Perkins	4	Do.

BLOOMINGTON FLUME, SAN BERNARDINO COUNTY.

See San Bernardino Valley.

BRISCOE CREEK, GLENN COUNTY.

See Stony Creek, Briscoe tributary.

BURNEY CREEK.

See Pit River, Burney tributary.

BUTANO CREEK.

Discharge measurement of Butano Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec. feet.	
Oct. 17, 1893	W. W. Brier	2.05	5 miles above junction with Pescadero Creek.

CACHE CREEK.[a]

This stream is the outlet of Clear Lake, in Lake County, Cal., and is described in Water-Supply Paper No. 51, p. 453.

On account of the great importance of Clear Lake as a storage reservoir, a gaging station was established at the wagon bridge across Cache Creek, one-half mile north of the town of Lower Lake, January 1, 1901. Gage rods were put in at this point and an observer was employed by Mr. P. N. Ashley, of Woodlands, for the Agricultural Department, about October, 1900, but no meter measurements were made.

In order to determine the evaporation from the surface of Clear Lake an evaporation pan and gage were placed in a cove near Lakeport in January, 1901, and the observations for evaporation were begun February 1 by Capt. D. C. Rumsey. The pan is not exposed to the full force of the wind, as the waves often run high.

Discharge measurements of Cache Creek, Lake County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Sept. 24, 1900	S. G. Bennett		3.8	Lower Lake Bridge.
Dec. 16, 1900	do	1.18	123	Do.
Jan. 25, 1901	do	3.60	675	Do.
Apr. 13, 1901	do	3.80	673	Do.
June 17, 1901	S. Matthews	2.85	333	Do.
July 15, 1901	do	2.45	236	Do.
Aug. 13, 1901	do	2.05	144	Do.
Sept. 4, 1901	J. R. Anderson	1.72	88	Do.
Oct. 5, 1901	do	1.45	34	Do.
Nov. 9, 1901	do	1.20	20	Do.
Nov. 29, 1901	do	1.60	69	Do.
Dec. 30, 1901	do	1.60	65	Do.
Jan. 29, 1902	do	1.60	70	Do.
Feb. 13, 1902	do	2.50	260	Do.
Mar. 3, 1902	do	6.50	1,151	Do.
Mar. 19, 1902	do	7.70	1,866	Do.
Apr. 5, 1902	do	6.5	1,397	Do.
Apr. 24, 1902	do	5.9	1,212	Do.
May 3, 1902	do	5.2	1,042	Do.
May 19, 1902	do	4.5	853	Do.
May 31, 1902	do	4.0	720	Do.
June 14, 1902	do	3.6	629	Do.
July 12, 1902	do	3.1	422	Do.

[a] For a detailed statement concerning the hydrography of Cache Creek, see Water-Supply Paper No. 45, by A. E. Chandler.

Discharge measurements of Cache Creek, Lake County—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
July 26, 1902	J. R. Anderson	2.8	345	Lower Lake Bridge.
Aug. 9, 1902	do	2.7	289	Do.
Aug. 22, 1902	do	2.5	246	Do.
Sept. 6, 1902	do	2.3	193	Do.
Sept. 20, 1902	do	2.2	156	Do.
Oct. 4, 1902	do	2.1	108	Do.
Oct. 20, 1902	do	2.0	83	Do.
Nov. 4, 1902	do	2.1	118	Do,
Nov. 19, 1902	do	2.8	245	Do.
Dec. 19, 1902	S. G. Bennett	2.8	300	Do.
June 24, 1900	do		196	Rumsey, Colusa County.
June 25, 1900	do		189	Do.
Sept. 23, 1900	do		3.8	Do.
Apr. 12, 1901	do		811	Do.
Apr. 15, 1901	do	3.4	720	Woodland Bridge, Yolo County.
May 8, 1902	do	4.4	1,276	Do.
Sept. 25, 1902	do	1.4	56	Do.

Estimated monthly discharge of Cache Creek at Lower Lake.

[Drainage area, 500 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	2,020	155	535	32,896	1.07	1.23
February	2,520	615	909	50,483	1.82	1.89
March	1,330	805	1,079	66,345	2.16	2.49
April	805	530	654	38,916	1.31	1.46
May	570	380	481	29,576	.96	1.10
June	415	255	327	19,458	.65	.72
July	255	155	199	12,236	.40	.46
August	155	86	114	7,010	.23	.26
September	86	40	55	3,273	.11	.12
October	50	16	31	1,906	.06	.07
November	62	16	26	1,547	.05	.06
December	74	40	62	3,812	.12	.14
The year	2,520	16	373	263,858	.75	10.00

Estimated monthly discharge of Cache Creek at Lower Lake—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1902.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	78	40	53	3,259	0.11	0.13
February	1,345	52	381	21,160	.76	.79
March	2,080	1,275	1,766	108,587	3.53	4.07
April	1,660	1,100	1,427	84,912	2.85	3.18
May	1,100	670	865	53,187	1.73	1.99
June	670	460	556	33,084	1.11	1.24
July	460	310	380	23,365	.76	.88
August	310	200	243	14,941	.49	.56
September	200	130	163	9,699	.33	.37
October	150	110	127	7,809	.25	.29
November	580	110	263	15,650	.53	.59
December	340	280	307	18,877	.61	.70
The year	2,080	40	544	394,530	1.09	14.79

CAJON CREEK.

Discharge measurements of Cajon Creek, San Bernardino County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
June 8, 1900	S. G. Bennett	1.37	Keenebrook station.

CALAVERAS RIVER.

Discharge measurements of Calaveras River, Calaveras County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Sept. 6, 1899	S. G. Bennett	Dry	San Andreas, Jackson road.

Estimated monthly discharge of Calaveras River at Bellota.[a]

[Drainage area, 491 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November[b]	0	0	0	0
December[b]	0	0	0	0
1879.				
January	229	14,081	0.47	0.54
February	648	35,988	1.32	1.37
March	1,068	65,669	2.18	2.51
April	680	40,463	1.38	1.54
May	166	9,878	.34	.39
June[b]	98	5,831	.20	.22
July[b]	24	1,476	.05	.06
August[b]	0	0	0	0
September[b]	0	0	0	0
October[b]	0	0	0	0
November[b]	0	0	0	0
December[b]	295	18,139	.60	.69
The year[b]	267	191,525	.55	7.32
1880.[c]				
January	221	13,589	.45	.52
February	393	22,606	.80	.86
March	614	37,753	1.25	1.44
April	4,174	248,370	8.50	9.48
May	1,473	90,571	3.00	3.46
June	196	11,663	.40	.45
July	24	1,476	.05	.06
August	10	615	.02	.02
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	246	15,126	.50	.58
The year	613	441,769	1.25	16.87

[a] Authority, California State engineering department.

[b] For November and December, 1878, and from June, 1879, to October, 1884, estimated from run off of neighboring stream.

[c] Estimated from run-off of neighboring stream.

Estimated monthly discharge of Calaveras River at Bellota—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1881.[a]	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,473	90,571	3.00	3.46
February	2,700	149,950	5.50	5.73
March	982	60,381	2.00	2.31
April	982	58,433	2.00	2.23
May	196	12,052	.40	.46
June	74	4,403	.15	.17
July	49	3,013	.10	.12
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	74	4,550	.15	.17
The year	544	383,353	1.11	14.65
1882.[a]				
January	344	21,152	.70	.81
February	442	24,547	.90	.94
March	1,719	105,697	3.50	4.04
April	1,719	102,288	3.50	3.90
May	2,946	181,142	6.00	6.92
June	246	14,638	.50	.56
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	98	6,026	.20	.23
November	147	8,747	.30	.33
December	147	9,039	.30	.35
The year	651	473,276	1.33	18.08

[a] Estimated from run-off of neighboring stream.

Estimated monthly discharge of Calaveras River at Bellota—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1883.[a]	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	491	30,190	1.00	1.15
February	393	21,826	.80	.83
March	737	45,316	1.50	1.73
April	982	58,433	2.00	2.23
May	491	30,190	1.00	1.15
June	196	11,663	.40	.45
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	74	4,550	.15	.17
November	24	1,428	.05	.06
December	49	3,013	.10	.12
The year	286	206,609	.58	7.89
1884.[a]				
January	196	12,052	.40	.46
February	2,455	141,213	5.00	5.39
March	2,946	181,142	6.00	6.92
April	2,455	146,083	5.00	5.58
May	491	30,190	1.00	1.15
June	491	29,217	1.00	1.12
July	196	12,052	.40	.46
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0

[a] Estimated from run-off of neighboring stream.

CALIENTE CREEK.[a]

Discharge measurements of Caliente Creek, Kern County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
May 1, 1895	J. B. Lippincott	23	1½ miles northwest of station.

[a] Stream usually dry in summer months.

Estimated monthly discharge of Caliente Creek, Kern County, at base of foothills.[a]

[Drainage area, 423 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
November	0	0	0	0
December	0	0	0	0
1879.				
January	34	2,091	0.08	0.09
February	59	3,277	.14	.15
March	30	1,845	.07	.08
April	106	6,307	.25	.28
May	76	4,673	.18	.21
June	25	1,488	.06	.07
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	110	6,545	.26	.29
December	212	13,035	.50	.58
The year	54	39,261	.13	1.75
1880.				
January	508	31,236	1.20	1.38
February	973	55,968	2.30	2.48
March	1,100	67,636	2.60	3.00
April	1,227	73,012	2.90	3.24
May	846	52,019	2.00	2.31
June	212	12,615	.50	.56
July	21	1,291	.05	.06
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	85	5,058	.20	.22
December	212	13,035	.50	.58
The year	432	311,870	1.02	13.83

[a] Estimated from run-off of neighboring streams. Authority, California State engineering department.

Estimated monthly discharge of Caliente Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1881.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	212	13,035	0.50	0.58
February	423	23,492	1.00	1.04
March	423	26,009	1.00	1.15
April	423	25,170	1.00	1.12
May	423	26,009	1.00	1.15
June	212	12,615	.50	.56
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	51	3,136	.12	.14
The year	181	129,466	.43	5.74
1882.				
January	51	3,136	.12	.14
February	63	3,499	.15	.16
March	212	13,035	.50	.58
April	212	12,615	.50	.56
May	42	2,582	.10	.12
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	63	3,749	.15	.17
December	63	3,874	.15	.17
The year	59	42,490	.14	1.90

Estimated monthly discharge of Caliente Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1883.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	63	3,874	0.15	0.17
February	63	3,499	.15	.16
March	338	20,783	.80	.92
April	212	12,615	.50	.56
May	169	10,391	.40	.46
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	42	2,582	.10	.12
November	42	2,499	.10	.11
December	63	3,874	.15	.17
The year	83	60,117	.20	2.67
1884.				
January	212	13,035	.50	.58
February	1,269	72,994	3.00	3.24
March	1,269	78,028	3.00	3.46
April	846	50,340	2.00	2.23
May	169	10,391	.40	.46
June	212	12,615	.50	.56
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0

CALLOWAY CANAL.

See Kern River, Calloway canal.

CAMP CARLTON DITCH, SAN BERNARDINO COUNTY.

See San Bernardino Valley, Camp Carlton ditch.

CANYADA DEL CORRAL.

Discharge measurement of Canyada del Corral Creek.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.15	Santa Barbara County.

CANYADA LARES.

Discharge measurement of Canyada Lares Creek.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.08	Santa Barbara County.

CANYADA REFUGIO.

Discharge measurement of Canyada Refugio Creek.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.31	Santa Barbara County.

CANYADA VERDE.

Discharge measurement of Canyada Verde Creek.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.08	Santa Barbara County.

CAPITAN CREEK.

Discharge measurement of Capitan (El) Creek.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.23	Santa Barbara County.

CARPENTERIA CREEK.

Discharge measurement of Carpenteria Creek.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.08	Santa Barbara County, 1 mile above Placitas Road.
June 16, 1900	R. Moyer	.003	Do.

CARSON RIVER.

EAST FORK CARSON RIVER.

This branch of Carson River has its source in the high Sierra of California, and flows northward, crossing the Nevada-California boundary line and entering Carson Valley at Rodenbah's ranch, about 20 miles from Carson, a little east of south. There it turns to the northwest, and a short distance above the town of Genoa unites with the West Fork, forming Carson River. The drainage area above Rodenbah's is 414 square miles in extent, and is mapped on the Markleeville and Dardanelles atlas sheets of the United States Geological Survey. This gaging station was established by L. H. Taylor on October 17, 1900, at the place where measurements were made in the years 1890, 1891, and 1892. The rod was an inclined timber securely fastened to posts set in the right bank of the stream. The bench mark was on a basalt rock at the edge of the stream, 20 feet from the gage, and was at an elevation of 6.3 feet above gage datum. The channel at the station is straight and the banks are high. The stream bed is of cobbles and gravel, and is quite stable. Measurements are made from a cable and suspended car. On August 2, 1901, a loose rock dam was raised a short distance below the gaging station, which affected the velocity at the latter point. The dam was partly washed out by a freshet on December 4, 1901. On March 10, 1901, a new gage was established a short distance downstream from the original one, which had been destroyed. It consists of a vertical timber driven into the stream bed at the right bank and spiked to a cottonwood tree. A bench mark was also established on a large granite bowlder 20 feet south of the gage, under the cable from which the measurements are made. Its elevation is 8.10 feet above the datum of the gage.

Discharge measurements of East Fork Carson River, near Gardnerville, Nev.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
Mar. 10, 1901	L. H. Taylor	4.00	459
Apr. 30, 1901	do	4.55	[a] 864
June 4, 1901	do	5.85	1,868
June 9, 1901	do	5.40	1,356
Sept. 29, 1901	do	3.70	[a] 127
Nov. 7, 1901	do	3.70	[a] 117
Dec. 19, 1901	do	3.40	156

[a] Approximate.

Estimated monthly discharge of East Fork Carson River, at Gardnerville (Rodenbah), Nev.

[Drainage area, 1,519 square miles.]

Month.	Mean discharge.	Month.	Mean discharge.
1890.	*Sec.-ft.*	1891—Continued.	*Sec.-ft.*
April	1,026	October	385
May	2,654	November	385
June	2,430	December	438
July	1,789	The year	619
August	597	1892.	
September	415	January	390
October	386	February	388
November	384	March	422
December	379	April	478
1891.		May	1,226
January	388	June	1,158
February	402	July	506
March	783	August	413
April	452	September	414
May	1,445	October	416
June	1,328	November	414
July	618	December	1,097
August	408	The year	610
September	388		

For further details of the flow of East and West forks ot Carson River, see the Twelfth Annual Report of the United States Geological Survey, Pt. II, page 351.

WEST FORK, CARSON RIVER.

This stream rises on the eastern slope of the Sierra Nevada in California, immediately southeast of the source of Truckee River, and, flowing in a general northeast direction, crosses the State line into Nevada and joins the East Fork near Genoa, in Carson Valley. The drainage area is mapped on the Markleeville atlas sheet of the United States Geological Survey. This gaging station, established by L. H. Taylor on October 18, 1900, is about three-fourths of a mile above the post-office at Woodfords, near the point where measurements were made in 1890, 1891, and 1892. The gage at present in use is a vertical timber, but it is only temporary, the equipment of the station being incomplete. The channel at the station is straight, the banks are high and rocky, and the bed is of rock and gravel and not likely to shift. Measurements are made from a car suspended on a steel cable across the stream.

Discharge measurements of West Fork, Carson River, near Woodfords, Cal.

Date.	Hydrographer	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
Mar. 8, 1901	L. H. Taylor	3.30	1.58
Apr. 28, 1901	do	3.95	[a]3.21
May 26, 1901	do	3.80	2.85
May 31, 1901	do	4.05	[a]3.50
June 13, 1901	do	3.75	2.74
Sept. 21, 1901	do	2.35	.31
Nov. 6, 1901	do	2.60	.68
Apr. 22, 1902	D. W. Hayes		182.50
May 13, 1902	C. V. Taylor		422.50
July 3, 1902	D. W. Hayes		157.60
July 30, 1902	do		46.70
Aug. 6, 1902	C. V. Taylor		53.00
Sept. 9, 1902	L. L. Richards		40.00

[a]Approximate.

Estimated monthly discharge of West Fork Carson River, at Woodfords, Cal.

[Drainage area, 70 square miles.]

Month.	Mean discharge.	Month.	Mean discharge.
1890.	*Sec.-ft.*	1891—Continued.	*Sec.-ft.*
April	284	May	534
May	657	June	338
June	614	July	130
July	380	August	65
August	135	September	41
September	75	October	48
October	67	November	43
November	49	December	47
December	53	The year	128
1891.		1892.	
January	52	January	45
February	48	February	46
March	61	March	65
April	127		

Discharge measurements in Carson River Basin.

Date.	Hydrographer.	Discharge.	Location.
		Sec. ft.	
Aug. 6, 1902	C. V. Taylor	0.72	Indian Creek and Harvey's ditch.
Do	do	1.18	Hawkins Creek, one-fourth mile above Hawkins's house.
Sept. 9, 1902	L. L. Richards	1.10	Do.
Aug. 6, 1902	C. V. Taylor	1.27	Petersons Creek, near old sawmill.
Sept. 9, 1902	L. L. Richards	.42	Petersons Creek, above Cohn's meadow.
Aug. 6, 1902	C. V. Taylor	2.84	Bruns Creek, mouth of canyon.
Sept. 9, 1902	L. L. Richards	3.48	Do.

CASCADE CREEK, TUOLUMNE COUNTY.

See Stanislaus River, Cascade Creek.

CHERRY CREEK, TUOLUMNE COUNTY.

See Tuolumne River, Cherry Creek.

CHINO CREEK, RIVERSIDE COUNTY.

See Santa Ana River, Chino Creek.

CHOWCHILLA CREEK.

Estimated monthly discharge of Chowchilla Creek at base of foothills.[a]

[Drainage area, 268 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	0	0	0	0	0	0
December	0	0	0	0	0	0
1879.						
January	140	0	8	492	0.03	0.03
February	1,000	0	56	3,110	.21	.22
March	760	0	63	3,874	.24	.28
April	300	11	48	2,856	.18	.20
May	140	0	14	861	.05	.06
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	192	0	12	738	.04	.04
The year	1,000	0	17	11,931	.06	.83
1880.						
January	18	0	5	307	.02	.02
February	1,500	0	167	9,606	.62	.67
March	91	11	19	1,168	.07	.08
April	6,380	0	1,266	75,332	4.72	5.26
May[b]	----------	----------	53	3,259	.20	.23
June[b]	----------	----------	27	1,607	.10	.11
July[b]	0	0	0	0	0	0
August[b]	0	0	0	0	0	0
September[b]	0	0	0	0	0	0
October[b]	0	0	0	0	0	0
November[b]	0	0	0	0	0	0
December[b]	----------	----------	201	12,359	.75	.86
The year	----------	----------	145	103,638	.54	7.23

[a] Authority, California State engineering department

[b] Estimated from previous measurements, or from run-off of neighboring stream.

Estimated monthly discharge of Chowchilla Creek at base of foothills—Continued.

Month.	Discharge.			Total discharge.	Run-off	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			295	18,139	1.10	1.27
February			375	20,826	1.40	1.46
March			83	5,103	.31	.36
April			11	655	.04	.04
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December			27	1,660	.10	.12
The year			66	46,383	.25	3.25
1882.						
January[a]			54	3,320	.20	.23
February	1,120	0	164	9,108	.61	.64
March	10,770	0	1,168	71,818	4.36	5.02
April[a]			268	15,947	1.00	1.12
May[a]			54	3,320	.20	.23
June[a]	0	0	0	0	0	0
July[a]	0	0	0	0	0	0
August[a]	0	0	0	0	0	0
September[a]	0	0	0	0	0	0
October[a]	0	0	0	0	0	0
November[a]			53	3,154	.20	.22
December[a]			27	1,660	.10	.12
The year			149	108,327	.56	7.58

[a] Estimated from previous measurements, or from run-off of neighboring stream.

Estimated monthly discharge of Chowchilla Creek at base of foothills—Continued.

Month.	Discharge.			Run-off.		
	Maximum.	Minimum.	Mean.	Total discharge.	Per square mile.	Depth.
1883.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			80	4,919	0.30	0.35
February			53	2,943	.20	.21
March			268	16,479	1.00	1.15
April			134	7,974	.50	.56
May			107	6,579	.40	.46
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	0	0	0	0	0	0
The year			54	38,894	.20	2.73
1884.[a]						
January			27	1,660	.10	.12
February			1,340	77,078	5.00	5.39
March			1,608	98,872	6.00	6.92
April			1,072	63,788	4.00	4.46
May			804	49,436	3.00	3.46
June			804	47,841	3.00	3.35
July			268	16,479	1.00	1.15
August			27	1,660	.10	.12
September			0	0	0	0
October			0	0	0	0

[a] Estimated from previous measurements, or from run-off of neighboring stream.

CITY CREEK.

Discharge measurements of City Creek at mouth of canyon, San Bernardino County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
June 11, 1898	J. B. Lippincott	3.03
Sept. 9, 1898	do	.07
Mar. 25, 1899	S. G. Bennett	8.80
Aug. 25, 1899	do	.17
July 12, 1900	do	.16
Oct. 1, 1900	W. W. Cockins, jr	.21
Apr. 7, 1902	S. G. Bennett	12.5
Sept. 4, 1902	W. B. Clapp	.2

Note.—For measurements of sundry small canals from City Creek in San Bernardino Valley see Santa Ana River near Cotton. Detailed descriptions given in Water-Supply Paper No. 59.

COLD SPRING CANYON.

Discharge measurements of Cold Spring Canyon, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. 13, 1897	Montecito Water Co	0.66	City tunnel.
Do	do	.08	Creek at falls.
Sept. 6, 1897	do	.31	City tunnel.
Do	do	.06	Creek at falls.
Sept. 12, 1897	do	.31	City tunnel.
Do	do	.09	Creek at falls.
Oct. 2, 1897	do	.28	City tunnel.
Do	do	.09	Creek at falls.
Dec. 8, 1897	do	.22	City tunnel.
Do	do	.09	Creek at falls.
Jan. 26, 1898	do	.22	City tunnel.
Do	do	.11	Creek at falls.
June 14, 1900	R. Moyer	.02	City tunnel, station 29+97.
Do	do	.04	City tunnel, 100 feet from head, station 29+27.
Apr. 19, 1898	Montecito Water Co	.22	City tunnel.
June 10, 1900	J. B. Lippincott	.41	City tunnel at Portal.
Do	do	Dry.	Creek at falls.
Mar. 22, 1896	Montecito Water Co	.06	City tunnel.
Do	do	Dry.	Creek at falls.
Aug. —, 1889	G. F. Wright	.23	

COLDWATER CREEK.

Discharge measurements of Coldwater Creek, Riverside County, one-fifth mile above dam.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Jan. 4, 1899	F. Rolfe	0.82
Jan. 18, 1899	do	1.43
Jan. 27, 1899	do	.84
Feb. 3, 1899	do	.99
Feb. 11, 1899	do	.97
Feb. 18, 1899	do	.78
Feb. 24, 1899	do	.94
Mar. 1, 1899	do	.92
Mar. 12, 1899	do	.71
Mar. 17, 1899	do	1.60
Mar. 25, 1899	do	1.18
Mar. 31, 1899	do	.84
Apr. 14, 1899	do	.68
Apr. 15, 1899	do	.62
Apr. 21, 1899	do	.26
Apr. 26, 1899	do	.38
May 5, 1899	do	.37
May 13, 1899	do	.21
May 17, 1899	do	.21
May 29, 1899	do	.27
May 31, 1899	do	.38
Do	do	.30
June 5, 1899	do	.30
June 7, 1899	do	.22

COLORADO RIVER.

Discharge measurements of Colorado River.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Aug. 18, 1875	U. S. Engineers		18,410	Stones Ferry.
Aug. 20, 1875	do		11,610	Camp Mohave.
Mar. 15, 1876	do		7,659	Yuma.
Jan. 17, 1895	J. B. Lippincott	20.3	9,737	Do.
Apr. 18, 1895	do	20.2	21,094	Do.
July 10, 1895	do	21.2	45,533	Do.
May 20, 1896	do	22.2	57,903	Do.

Discharge measurements of Colorado River—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Aug. 18, 1901	H. G. Heisler	20.71	18,683	Yuma.
Jan. 9, 1902	J. B. Lippincott	17.2	3,637	Do.
Feb. 20, 1902	S. G. Bennett	17.15	3,239	Do.
May 30, 1902	do	23	38,400	Do.
July 9, 1902	do	20.52	14,799	Do.
July 7, 1902	W. W. Follett	21.06	18,350	Do.
Oct. 11, 1902	S. G. Bennett	18.5	6,030	Do.
Oct. 14, 1902	R. P. H. Laney	17.9	4,798	Do.
Oct. 17, 1902	do	17.5	3,559	Do.
Oct. 21, 1902	do	17.6	4,203	Do.
Oct. 24, 1902	do	17.5	3,547	Do.
Nov. 12, 1902	S. G. Bennett	17.4	3,614	Do.
Nov. 13, 1902	do	17.5	3,865	Do.
Nov. 15, 1902	W. D. Smith	18.55	5,276	Do.
Nov. 18, 1902	do	18.05	4,213	Do.
Nov. 20, 1902	do	18	4,368	Do.
Nov. 22, 1902	do	18.10	4,600	Do.
Nov. 24, 1902	do	18.45	5,500	Do.
Nov. 26, 1902	do	18.40	4,979	Do.
Nov. 28, 1902	do	18.50	5,544	Do.
Dec. 1, 1902	do	20	12,596	Do.
Dec. 3, 1902	do	19.25	7,862	Do.
Dec. 5, 1902	do	18.85	6,347	Do.
Dec. 8, 1902	do	18.3	4,825	Do.
Dec. 10, 1902	do	18.2	5,081	Do.
Dec. 12, 1902	do	18	4,669	Do.
Dec. 15, 1902	do	17.65	3,818	Do.
Dec. 16, 1902	do	17.5	3,589	Do.
Dec. 18, 1902	do	18.3	5,361	Do.
Dec. 19, 1902	do	18.05	4,607	Do.
Dec. 20, 1902	do	18.05	5,237	Do.
Dec. 22, 1902	do	17.7	4,698	Do.
Dec. 24, 1902	do	18	4,863	Do.
Dec. 26, 1902	do	18.1	5,356	Do.
Dec. 27, 1902	do	18.3	5,497	Do.
Dec. 29, 1902	do	18	4,588	Do.
Dec. 31, 1902	do	17.7	4,176	Do.

Estimated monthly discharge of Colorado River at Yuma.

[Drainage area, 225,049 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1902.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	4,520	3,230	3,727	229,164	0.017	0.020
February	4,720	3,300	3,955	219,650	.018	.019
March	5,340	4,340	4,903	301,474	.022	.025
April	11,400	4,340	6,179	367,676	.027	.030
May	59,200	11,400	35,961	2,211,156	.160	.184
June	56,200	29,000	42,520	2,530,115	.189	.211
July	27,000	5,130	12,527	770,255	.056	.065
August	5,560	3,230	4,183	257,203	.019	.022
September	8,360	3,050	3,819	227,246	.017	.019
October	6,600	3,140	4,299	264,335	.019	.022
November	5,540	3,140	4,187	249,144	.019	.021
December	12,600	3,590	5,412	332,771	.025	.028
The year	59,200	3,050	10,973	7,960,189	.049	.666

Discharge measurements of Colorado River at Bulls Head Canyon.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
Dec. 5, 1902	J. T. Whistler	3	5,786
Dec. 10, 1902	L. M. Barnes	2.65	4,051
Dec. 13, 1902	do	2.45	3,222
Dec. 17, 1902	do	2.95	4,138
Dec. 20, 1902	do	3.50	4,792
Dec. 24, 1902	do	3.23	4,939
Dec. 29, 1902	do	2.45	3,366
Dec. 31, 1902	do	2.20	2,913

COLTON CITY AND COLTON TERRACE, SAN BERNARDINO COUNTY.

See San Bernardino Valley.

CONVICT CREEK.

See Owens River, Convict Creek.

COSUMNES RIVER.

Discharge measurements of Cosumnes River, Eldorado County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Sept. 16, 1899	S. G. Bennett	2	Bridge near Latrobe, Jackson road.
Do	do	2	Ditch on south side of Latrobe, Jackson road.
Sept. 12, 1900	do	1.7	Bridge near Latrobe, Jackson road.
Do	do	3.7	Ditch on south side.

Estimated monthly discharge of Cosumnes River at Live Oak Suspension Bridge, Sacramento County.[a]

[Drainage area, 580 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	29	1,726	0.05	0.06
December	29	1,783	.05	.06
1879.				
January	290	17,831	.50	.58
February	1,218	67,644	2.10	2.19
March	1,740	106,988	3	3.46
April	3,132	186,367	5.40	6.03
May	3,248	199,712	5.60	6.46
June	3,480	207,074	6	6.69
July	422	25,948	.73	.84
August	116	7,133	.20	.23
September	23	1,369	.04	.04
October	17	1,045	.03	.03
November	52	3,094	.09	.10
December	406	24,964	.70	.81
The year	1,179	849,169	2.03	27.46

[a] Authority, California State engineering department Estimated from run-off of neighboring drainage basins.

Estimated monthly discharge of Cosumnes River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1880.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	232	14,265	0.40	0.46
February	441	25,367	.76	.82
March	696	42,795	1.20	1.38
April	4,582	272,648	7.90	8.81
May	5,104	313,833	8.80	10.15
June	6,090	362,380	10.50	11.71
July	2,726	167,615	4.70	5.42
August	348	21,398	.60	.69
September	29	1,726	.05	.06
October	17	1,045	.03	.03
November	12	714	.02	.02
December	290	17,831	.50	.58
The year	1,714	1,241,617	2.96	40.13
1881.				
January	1,624	99,856	2.80	3.23
February	3,074	170,721	5.30	5.52
March	1,102	67,759	1.90	2.19
April	3,190	189,818	5.50	6.14
May	3,074	189,013	5.30	6.11
June	1,218	72,476	2.10	2.34
July	174	10,699	.30	.35
August	87	5,349	.15	.17
September	87	5,177	.15	.17
October	58	3,566	.10	.12
November	174	10,354	.30	.33
December	522	32,097	.90	1.04
The year	1,199	856,885	2.07	27.71

Estimated monthly discharge of Cosumnes River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1882.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	522	32,097	0.90	1.04
February	522	28,990	.90	.94
March	1,740	106,988	3	3.46
April	2,320	138,050	4	4.46
May	4,524	278,170	7.80	8.99
June	2,900	172,562	5	5.58
July	696	42,795	1.20	1.38
August	580	35,663	1	1.15
September	52	3,094	.09	.10
October	232	14,265	.40	.46
November	100	5,950	.17	.19
December	100	6,149	.17	.20
The year	1,191	864,773	2.05	27.95
1883.				
January	348	21,398	.60	.69
February	290	16,106	.50	.52
March	522	32,097	.90	1.04
April	1,740	103,537	3	3.35
May	3,480	213,977	6	6.92
June	2,320	138,050	4	4.46
July	580	35,663	1	1.15
August	232	14,265	.40	.46
September	87	5,177	.15	.17
October	87	5,349	.15	.17
November	116	6,902	.20	.22
December	116	7,133	.20	.23
The year	827	599,654	1.43	19.38

Estimated monthly discharge of Cosumnes River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1884.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	145	8,916	0.25	0.29
February	1,740	100,086	3	3.24
March	3,480	213,977	6	6.92
April	3,480	207,074	6	6.69
May	2,900	178,314	5	5.76
June	2,320	138,050	4	4.46
July	2,320	142,651	4	4.61
August	580	35,663	1	1.15
September	116	6,902	.20	.22
October	87	5,349	.15	.17

COW CREEK, TUOLUMNE COUNTY.

See Stanislaus River, Cow Creek.

CUCAMONGA CREEK.

Discharge measurements of Cucamonga Creek, San Bernardino County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. 26, 1898	F. H. Olmsted	1.04	Headworks in canyon.
July 11, 1900	S. G. Bennett	1.08	Do.
Oct. 7, 1901	do	2.06	Do.
Apr. 3, 1902	do	4.80	Do.

Following is a table showing measurements of cienagas and developed water at Red Hill:

Tabulation of measurements of cienagas and developments at Red Hill as indicated in miners' inches.

[Fifty miners' inches to one second-foot.]

Date.	Hydrographer.	East side.								West side.										
		Creek Div. box, 30-inch line.	Div. box 1, 16-inch line and V tunnel, built in 1886–1887.	China cienega	Lone Star Spring tunnel.	V tunnel, built prior to 1886.	Ciénaga below No. 1.	Total without Lone Star.	Total.	Spring northwest of tunnel No. 2 portal.	W. cienega, "D."	Picnic Spring, cienega C.	Artesian wells Nos. 1 and 2.	Tiburcio Spring.	Tunnel No. 2 on 90-acre.	China garden.	Stowell wells and tunnel above 90-acre tract.	Rain previous season.	Total on 90-acre tract.	Grand total, Red Hills.
Sept. 26, 1885	Wm. M. Fitzhugh	225.36	.....	51.73	(2.02)	6.61 9.61 16.22	.....	293.31	295.33	56.47	45.27	(9.00)	.....	(1.00)	.....	.....	.....	10.81	111.74	406.07
Nov. 30, 1886	J. P. Culver	261.43	64.67	11.46	2.02	.....	.....	337.56	339.57	9.50	5.70 97.80 .90 104.40	18.40	.....	2.16	.....	(*a*)	.....	21.83	134.46	474.03
July 24, 1887	F. Eaton	147.50	169.50	(10.00)	(2.00)	163.00	.....	327.00	329.00	13.67	31.90	10.00	(*b*)	(1.00)	.....	(16.76)	.....	14.50	73.33	402.33
July 13, 1888	J. P. Culver	155.78	183.61	18.10	c13.59	138.62	46.43	357.49	371.08	3.14	38.89	5.38	15.14	1.59	d17.70	16.76	.....	17.76	98.60	469.68
July 13, 1889	E. T. Wright	184 58	163.57	13.27	9.78	136.23	48.36	361.42	371.20	3.94	40.53	17.33	15.14	1.81	54.02	(16.76)	.....	20.97	149.53	520.73
July 14, 1890	do	260.03	228.53	17.32	10.85	156.01	72.52	505.88	516.73	3.08	71.98	30.53	13.98	0.92	c73.82	(16.76)	.....	25.45	211.07	727.80
July 14, 1890	J. P. Culver	266.82	238.04	18.50	11.25	165.55	72.49	523.36	534.61	3.14	81.78	31.47	14.29	2.38	75.42	(16.76)	.....	.....	225.24	759.85
June 29, 1893	E. T. Wright	.....	.....	.....	.....	152.42	.....	.....	.....	.....	.....	13.29	.....	.....	.....	.....	.....	19.82	.....	.....
July 14, 1893	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36.45	.....	.....	.....	.....	.....
Sept. 15, 1894	do	f160.31	182.84	13.14	(8.00)	141.10	41.74	356.29	364.29	.....	.....	.....	.....	.....	.....	.....	.....	8.13	.....	.....
June 12, 1895	do	198.53	154.87	21.00	(7.00)	(110.60)	(44.27)	374.40	381.40	.....	.....	.....	.....	.....	.....	.....	.....	20.98	.....	.....
June 14, 1896	N. W. Stowell	.....	.....	.....	.....	.....	.....	.....	.....	0.00	22.00	1.00	23.00	.....	g18.00	.....	0.00	.....	64.00	352.55
Aug. 20, 1896	F. E. Trask	132 40	137 90	11.25	(7.00)	...	.....	281.55	288.55	.....	.....	.....	.....	.....	.....	.....	.....	8 11	.....	.....

Mar. 2,1897	N. W Stowell																46.00			
Aug. 5 1897	do				9.42					0.00	20.00 7.00 27.00	(0.50)	h20.25	0.00	41.40	0.00			89.15	334 07
Aug. 10,1897	F E Trask	104.90	120.10	10.50	i(9.42)			235.50	244.92	0.00								16.74		
Aug. 13,1898	do	76.68	95.91	7.84	j47.00			180.43	227.43	0.00								8.24		
Aug. 14,1898	N. W Stowell									0.00	k24.00	(0.50)	l13.00	0.00	26.00	0.00			63.50	290.93
Apr. 1,1899	do	107.25	98.20					205.45										7.49		
Aug. 21,1899	E T. Wright	m91.58	80.95		n27.00 o75.00	56.17	24.78	172.53	n199.53 p247.53	0.00										
Aug 25 1899	E.T. Wright and F. C. Finkle										3.13		2.68		61.80		92.40		67.61	267.14
Apr. 1,1899	Newman and Finkle	107.25	98.20	(5.00)	q35.60	72.60		210.45	246.05	0.00	q15.49		7.90							
Feb. 3 and 5,1900.	Newman, Trask, and Finkle	m97.06	77.22		17.06	54.88		174.28	191.34	0.00	3.91		1.45							
Feb. 11,1900	Trask and Finkle										3.81	0.56	1.20		55.90		76.25		61.47	252.81

a China garden included in "D."
b Fall, 1897.
c Tunnel.
d Construction begun January, 1888.
e Length, 2,600 feet.
f 1 p. m.
g Caved in.
h August 4, well No. 2 cut.
i Exterior of tunnel begun, 11.
j Stowell.
k June 12, not pumped.
l July 24, not pumped.
m And China cienega.
n Flow.
o Pumped.
p When Lone Star Tunnel was pumped.
q March 15.

Discharge measurements of tributaries of Cucamonga Creek around Red Hills.

Date.	Hydrographer.	Discharge	Locality.
		Sec.-feet.	
Sept. 9, 1898	O. J. Sutton	2.20	Springs.
Do	do	2.80	Tunnels.
Do	do	1.80	Artesian wells.
Total		6.80	
Aug. 29, 1899	S. G. Bennett	2.48	From Stowell wells to Ontario.
July 11, 1900	S. G. Bennett	4.03	East side.
Do	do	2.97	West side.
Do	do	2.13	San Antonio water, Haskell well.
Do	do	1.72	Sixteenth street wells.
Total from Red Hills.		10.85	

DALEY DITCH, SAN BERNARDINO COUNTY.

See San Bernardino Valley, Daley ditch.

DEER CREEK.

Estimated monthly discharge of Deer Creek, Tulare County, at base of foothills.[a]

[Drainage area, 110 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
November	0	0	0	0
December	0	0	0	0
1879.				
January	9	553	0.08	0.09
February	15	833	.14	.15
March	8	492	.07	.08
April	28	1,666	.25	.28
May	20	1,230	.18	.21
June	7	417	.06	.07
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	29	1,726	.26	.29
December	55	3,382	.50	.58
The year	14	10,299	.13	1.75

[a] Authority, California State engineering department. Estimated from run-off of neighboring streams.

Estimated monthly discharge of Deer Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1880.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	132	8,116	1.20	1.38
February	253	14,553	2.30	2.48
March	286	17,585	2.60	3.00
April	319	18,982	2.90	3.24
May	220	13,527	2.00	2.31
June	55	3,273	.50	.56
July	6	369	.05	.06
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	22	1,309	.20	.22
December	55	3,382	.50	.58
The year	112	81,096	1.02	13.83
1881.				
January	55	3,382	.50	.58
February	110	6,109	1.00	1.04
March	110	6,764	1.00	1.15
April	110	6,545	1.00	1.12
May	110	6,764	1.00	1.15
June	55	3,273	.50	.56
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	23	1,414	.21	.24
The year	48	34,251	.43	5.84

Estimated monthly discharge of Deer Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile	Depth
1882.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	23	1,414	0.21	0.24
February	17	944	.15	.16
March	55	3,382	.50	.58
April	55	3,273	.50	.56
May	11	676	.10	.12
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	11	676	.10	.12
November	17	1,012	.15	.17
December	6	369	.05	.06
The year	16	11,746	.15	2.01
1883.				
January	17	1,045	.15	.17
February	17	944	.15	.16
March	88	5,411	.80	.92
April	55	3,273	.50	.56
May	44	2,705	.40	.46
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	11	676	.10	.12
November	11	655	.10	.11
December	17	1,045	.15	.17
The year	22	15,754	.21	2.67

Estimated monthly discharge of Deer Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1884.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	55	3,382	0.50	0.58
February	330	18,982	3.00	3.24
March	330	20,291	3.00	3.46
April	220	13,091	2.00	2.23
May	44	2,705	.40	.46
June	55	3,273	.50	.56
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0

DINSMORE CREEK.

Discharge measurement of Dinsmore Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Aug. —, 1889	G. F. Wright	0.23

DOBBINS CREEK.

Discharge measurement of Dobbins Creek, Yuba County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Apr. 29, 1901	F. S. Hyde	[a] 224

[a] Estimated, at dam.

DOS PUEBLOS CREEK.

Discharge measurement of Dos Pueblos Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Aug. —, 1889	G. F. Wright	0.54

DRY OR JACKSON CREEK.

Estimated monthly discharge of Dry Creek, San Joaquin County, at base of foothills. [a]

[Drainage area, 283 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
November	0	0	0	0
December	0	0	0	0
1879.				
January	84	5,165	0.30	0.35
February	425	23,603	1.50	1.56
March	849	52,203	3.00	3.46
April	425	25,289	1.50	1.67
May	113	6,948	.40	.46
June	57	3,392	.20	.22
July	15	922	.05	.06
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	198	12,175	.70	.81
The year	181	129,697	.64	8.59
1880.				
January	127	7,809	.45	.52
February	140	8,053	.49	.53
March	354	21,767	1.25	1.44
April	2,264	134,717	8.00	8.93
May	879	54,048	3.11	3.59
June	113	6,724	.40	.45
July	15	922	.05	.06
August	6	369	.02	.02
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	142	8,731	.50	.58
The year	337	243,140	1.19	16.12

[a] Authority, California State engineering department. Estimated from run-off of neighboring streams.

Estimated monthly discharge of Dry Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1881.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	879	54,048	3.11	3.59
February	1,557	86,471	5.50	5.73
March	566	34,802	2.00	2.31
April	566	33,679	2.00	2.23
May	113	6,948	.40	.46
June	42	2,499	.15	.17
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	57	3,392	.20	.22
December	254	15,618	.90	1.04
The year	336	237,457	1.19	15.75
1882.				
January	254	15,618	.90	1.04
February	283	15,717	1.00	1.04
March	849	52,203	3.00	3.46
April	566	33,679	2.00	2.23
May	57	3,505	.20	.23
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	15	893	.05	.06
October	57	3,505	.20	.23
November	84	4,998	.30	.33
December	84	5,165	.30	.35
The year	187	135,283	.66	8.97

Estimated monthly discharge of Dry Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1883.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	168	10,330	0.59	0.68
February	141	7,831	.50	.52
March	254	15,618	.90	1.04
April	283	16,840	1.00	1.12
May	168	10,330	.59	.68
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	15	922	.05	.06
November	0	0	0	0
December	15	922	.05	.06
The year	87	62,793	.31	4.16
1884.				
January	142	8,731	.50	.58
February	1,132	65,113	4.00	4.31
March	1,132	69,604	4.00	4.61
April	879	52,304	3.11	3.47
May	168	10,330	.59	.68
June	283	16,840	1.00	1.12
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0

EAST RIVERSIDE WATER COMPANY, SAN BERNARDINO COUNTY.

See San Bernardino Valley.

EATON CANYON.

Discharge measurements of Eaton Canyon, Los Angeles County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Jan. 11, 1899	E. P. Dewey	0.50	Near falls.
Oct. 18, 1898	J. B. Lippincott	1.87	Water from large wells in Eaton Wash.
Do	do	.04	Around superintendent's house and barns.
Do	do	.10	San Gabriel water.
Do	do	.10	Dairy well.
Nov. 14, 1898	do	2.11	

ELEANOR CREEK.

See Tuolumne River, Eleanor Creek.

FALLS CREEK.

See Tuolumne River, Falls Creek.

FALL RIVER.

See Pit River, Fall River.

FEATHER RIVER.

Discharge measurements of Feather River, Butte County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Feb. 18, 1879	State engineering department.		21,000	Hennesseys.
May 13, 1879	do		15,000	Do.
Feb. 19, 1879	do		12,000	Burts Ferry.
Aug. 31, 1879	do		1,200	Do.
Nov. 12, 1879	do		2,700	Do.
Mar. 6, 1879	do		56,000	Marysville.
Sept. 1, 1879	do		1,200	Do.
July 16, 1879	do		1,900	Near mouth.
Aug. 27, 1879	do		1,200	Oroville.
Sept. 1, 1879	do		1,800	Below mouth of Yuba.
Sept. 7, 1901	S. G. Bennett		34	West Branch of North Fork, Cherokee Pipe Crossing.
Sept. 18, 1900	do		1,123	Oroville Bridge.
Sept. 6, 1901	do		1,220	Do.

Discharge measurements of Feather River, Butte County—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Jan. 29, 1902	S. G. Bennett		1,960	Oroville Bridge.
Sept. 7, 1901	do		946	North Fork, Huffs Bar.
Mar. 1, 1902	do	8.7	15,228	Oroville Bridge.
May 7, 1902	do	8.75	15,476	Do.
Sept. 4, 1902	Chas. A. Miller	.96	1,385	Do.
Sept. 10, 1902	do	.92	1,390	Do.
Dec. 18, 1902	S. G. Bennett	3.65	3,298	Do.
Sept. 3, 1902	do		1	South Fork at Little Grass Valley.
Sept. 6, 1902	Chas. A. Miller		1	South Fork at bridge at Enterprise.
Do	do		216	South Fork at Bidwell Bar Bridge.
Do	do		30	South Fork Palermo Canal at Enterprise.
Sept. 4, 1902	S. G. Bennett		92	Middle Fork, below mouth of Nelson Creek.
Do	do		33	Middle Fork, Nelson Creek above mouth.
Do	do		28	Middle Fork, Spanish Creek at Pocket Bridge, lower end of American Valley.
Sept. 5, 1902	do		22	North Fork, Indian Creek at Indian Valley on Taylorsville road.
Do	do		607	North Fork at lower end Big Meadows.
Sept. 8, 1902	do		669	North Fork at Bidwell's sawmill.
Do	do		163	East Branch North Fork at Hamilton's bridge.
Sept. 9, 1902	do		64	Big Spring Branch of East Fork of North Fork at point 1 mile below boathouse.
Do	do		109	Dotta or Lower Big Spring Branch of North Fork at mouth.
Do	do		327	West Branch of North Fork near Prattville.
Sept. 7, 1902	do		27	Butte Valley Creek, North Fork, at Butte Valley post-office.
Sept. 9, 1902	Chas. A. Miller		595	North Fork, Huffs Bar.
Sept. 12, 1902	do		315	Big Bend Tunnel on North Fork, at portal of tunnel.
Sept. 9, 1902	do		27	West Fork of North Fork at Yankee Hill Bridge.

Estimated monthly discharge of Feather River at Oroville, Cal.

[Drainage area, 3,350 square miles.]

Month.	Discharge.			Total discharge	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1902.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	2,325	1,975	1,998	122,852	0.60	0.69
February	38,680	1,975	19,545	1,085,474	5.83	6.07
March	24,420	7,000	11,148	685,464	3.33	3.84
April	39,600	8,300	19,485	1,159,437	5.82	6.50
May	16,600	9,020	12,110	744,615	3.61	3.74
June	10,900	2,750	5,609	333,759	1.67	1.86
July	2,750	1,620	2,098	129,001	.63	.72
August	1,620	1,400	1,535	94,383	.46	.53
September	1,400	1,300	1,323	78,724	.40	.45
October	3,150	1,300	1,503	92,477	.45	.52
November	14,400	1,510	3,481	207,134	1.04	1.08
December	25,800	1,565	6,287	386,573	1.88	2.17
The year	39,600	1,300	7,177	5,119,893	2.14	28.57

FICAY CREEK.

Discharge measurement of Ficay Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge
		Sec.-feet.
Aug.—, 1889	G. F. Wright	0.31

FORT TEJON CREEK.

Discharge measurement of Fort Tejon Creek, in foothills, Kern County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Nov. 13, 1895	J. B. Lippincott	2.6
Feb. 3, 1896	do	3.5
June 4, 1896	do	1.1
Dec. 19, 1896	do	1.5

FRESNO CREEK.

Estimated monthly discharge of Fresno Creek, Madera County, at base of foothills.[a]

[Drainage area, 272 square miles.]

Month.	Maximum.	Minimum.	Mean.	Total discharge.	Run-off.	
					Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November[b]			0	0	0	0
December[b]			0	0	0	0
1879.						
January[c]	80	0	27	1,660	0.10	0.12
February[c]	117	66	80	4,443	29	.30
March[c]	202	66	118	7,256	.43	.50
April[c]	202	124	156	9,283	.57	.64
May[c]	102	66	79	4,858	.29	.33
June[c]	54	0	15	893	.06	.07
July[c]	0	0	0	0	0	0
August[c]	0	0	0	0	0	0
September[c]	0	0	0	0	0	0
October[c]	0	0	0	0	0	0
November[b]	0	0	0	0	0	0
December[b]			109	6,702	.40	.46
The year			49	35,095	.18	2.42
1880.[b]						
January			5	307	.02	.02
February			150	8,628	.55	.59
March			16	984	.06	.07
April			1,088	64,740	4.00	4.46
May			54	3,320	.20	.23
June			27	1,607	.10	.11
July			0	0	0	0
August			0	0	0	0
September			0	0	0	0
October			0	0	0	0
November			0	0	0	0
December			218	13,404	.80	.92
The year			130	92,990	.48	6.40

[a] Authority, California State engineering department.

[b] November and December, 1878, and from November, 1879, to October, 1884, inclusive, estimated from run-off of neighboring streams.

[c] Measured.

Estimated monthly discharge of Fresno Creek, etc.—Continued.

Month.	Maximum.	Minimum.	Mean.	Total discharge.	Run-off.	
					Per square mile.	Depth.
1881.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			544	33,449	2.00	2.31
February			544	30,212	2.00	2.08
March			272	16,725	1.00	1.15
April			109	6,486	.40	.45
May			54	3,320	.20	.23
June			0	0	0	0
July			0	0	0	0
August			0	0	0	0
September			0	0	0	0
October			0	0	0	0
November			0	0	0	0
December			27	1,660	.10	.12
The year			129	91,852	.48	6.34
1882.[a]						
January			54	3,320	.20	.23
February			163	9,053	.60	.62
March			1,088	66,899	4.00	4.61
April			272	16,185	1.00	1.12
May			54	3,320	.20	.23
June			0	0	0	0
July			0	0	0	0
August			0	0	0	0
September			0	0	0	0
October			27	1,660	.10	.12
November			54	3,213	.20	.22
December			27	1,660	.10	.12
The year			145	105,310	.53	7.27

[a] November and December, 1878, and from November, 1879, to October, 1884, inclusive, estimated from run-off of neighboring streams.

Estimated monthly discharge of Fresno Creek, etc.—Continued.

Month.	Maximum.	Minimum.	Mean.	Total discharge.	Run-off.	
					Per square mile.	Depth.
1883.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			82	5,042	0.30	0.35
February			54	2,999	.20	.21
March			272	16,725	1.00	1.15
April			136	8,093	.50	.56
May			109	6,702	.40	.46
June			0	0	0	0
July			0	0	0	0
August			0	0	0	0
September			0	0	0	0
October			0	0	0	0
November			0	0	0	0
December			0	0	0	0
The year			54	39,561	.20	2.73
1884.[a]						
January			27	1,660	.10	.12
February			1,360	78,228	5.00	5.39
March			1,632	100,348	6.00	6.92
April			1,088	64,740	4.00	4.46
May			816	50,174	3.00	3.46
June			816	48,555	3.00	3.35
July			272	16,725	1.00	1.15
August			27	1,660	.10	.12
September			0	0	0	0
October			0	0	0	0

[a] November and December, 1878, and from November, 1879, to October, 1884, inclusive, estimated from run-off of neighboring streams.

GAGE CANAL.

See San Bernardino Valley, Gage canal.

GATO CREEK.

Gato Creek was measured by Charles J. Johansen for the Pacific Improvement Company, as given below. It was gaged a short distance above its junction with the Loma Abajo, and at the time of its measurement no water was being conveyed in the pipe line situated along this stream.

Discharge measurements of Gato Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Feb. 7, 1890	Charles J. Johansen	2.26	At mouth.
Feb. 14, 1890	do	2.37	Do.
Feb. 27, 1890	do	2.81	Do.
Mar. 2, 1890	do	2.05	Do.
Mar. 4, 1890	do	1.95	Do.
Mar. 6, 1890	do	1.85	Do.
Mar. 9, 1890	do	1.85	Do.
Mar. 11, 1890	do	1.65	Do.
Mar. 13, 1890	do	1.55	Do.
Mar. 15, 1890	do	1.45	Do.
Mar. 17, 1890	do	1.36	Do.
Mar. 21, 1890	do	1.45	Do.
Mar. 23, 1890	do	1.36	Do.
Mar. 25, 1890	do	1.27	Do.
Mar. 27, 1890	do	1.09	Do.
Mar. 29, 1890	do	1.09	Do.
Mar. 31, 1890	do	1.00	Do.
Apr. 2, 1890	do	1.00	Do.
Apr. 4, 1890	do	.92	Do.
Apr. 6, 1890	do	.92	Do.
Apr. 8, 1890	do	.92	Do.
Apr. 10, 1890	do	.83	Do.
Apr. 12, 1890	do	.83	Do.
Apr. 14, 1890	do	.76	Do.
Apr. 16, 1890	do	.76	Do.
Apr. 17, 1890	do	.68	Do.
Apr. 18, 1890	do	.76	Do.
Apr. 20, 1890	do	.76	Do.
Apr. 22, 1890	do	.76	Do.
Apr. 24, 1890	do	.68	Do.
Apr. 26, 1890	do	.68	Do.
Apr. 28, 1890	do	.60	Do.
Apr. 30, 1890	do	.68	Do.
May 2, 1890	do	.60	Do.

Discharge measurements of Gato Creek, Santa Barbara County—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
May 4, 1890	Charles J. Johansen	0.68	At mouth.
May 6, 1890	do	.68	Do.
May 8, 1890	do	.60	Do.
May 10, 1890	do	.53	Do.
May 12, 1890	do	.53	Do.
May 14, 1890	do	.46	Do.
May 16, 1890	do	.53	Do.
May 18, 1890	do	.46	Do.
May 20, 1890	do	.46	Do.
May 22, 1890	do	.59	Do.
May 24, 1890	do	.59	Do.
May 26, 1890	do	.58	Do.
May 28, 1890	do	.56	Do.
May 30, 1890	do	.56	Do.
June 1, 1890	do	.54	Do.
June 3, 1890	do	.49	Do.
June 5, 1890	do	.50	Do.
June 7, 1890	do	.49	Do.
June 9, 1890	do	.44	Do.
June 11, 1890	do	.50	Do.
June 13, 1890	do	.45	Do.
June 15, 1890	do	.50	Do.
June 17, 1890	do	.58	Do.
June 19, 1890	do	.50	Do.
June 21, 1890	do	.49	Do.
June 23, 1890	do	.44	Do.
June 25, 1890	do	.47	Do.
June 27, 1890	do	.45	Do.
June 29, 1890	do	.42	Do.
July 1, 1890	do	.44	Do.
July 3, 1890	do	.49	Do.
July 5, 1890	do	.34	Do.
July 7, 1890	do	.35	Do.
July 9, 1890	do	.32	Do.
July 11, 1890	do	.34	Do.
July 13, 1890	do	.34	Do.
July 15, 1890	do	.35	Do.
July 17, 1890	do	.33	Do.
July 19, 1890	do	.35	Do.
July 21, 1890	do	.27	Do.
July 23, 1890	do	.32	Do.

Discharge measurements of Gato Creek, Santa Barbara County—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
July 25, 1890	Charles J. Johansen	0.26	At mouth.
July 27, 1890	do	.32	Do.
July 29, 1890	do	.34	Do.
July 31, 1890	do	.34	Do.
Aug. 2, 1890	do	.34	Do.
Aug. 4, 1890	do	.34	Do.
Aug. 6, 1890	do	.29	Do.
Aug. 8, 1890	do	.27	Do.
Aug. 10, 1890	do	.32	Do.
Aug. 12, 1890	do	.35	Do.
Aug. 14, 1890	do	.30	Do.
Aug. 15, 1890	do	.27	Do.
Aug. 17, 1890	do	.26	Do.
Aug. 19, 1890	do	.28	Do.
Aug. 21, 1890	do	.35	Do.
Aug. 23, 1890	do	.28	Do.
Aug. 25, 1890	do	.30	Do.
Aug. 27, 1890	do	.30	Do.
Aug. 29, 1890	do	.28	Do.
Aug. 31, 1890	do	.26	Do.
Sept. 2, 1890	do	.22	Do.
Sept. 4, 1890	do	.22	Do.
Sept. 6, 1890	do	.26	Do.
Sept. 8, 1890	do	.26	Do.
Sept. 10, 1890	do	.26	Do.
Sept. 12, 1890	do	.26	Do.
Sept. 14, 1890	do	.22	Do.
Sept. 16, 1890	do	.22	Do.
Sept. 18, 1890	do	.26	Do.
Sept. 21, 1890	do	.30	Do.
Sept. 22, 1890	do	.22	Do.
Sept. 24, 1890	do	.22	Do.
Sept. 26, 1890	do	.22	Do.
Sept. 28, 1890	do	.37	Do.
Sept. 30, 1890	do	.60	Do.
Oct. 2, 1890	do	.42	Do.
Oct. 4, 1890	do	.35	Do.
Oct. 6, 1890	do	.30	Do.
Oct. 7, 1890	do	.30	Do.

GAZOO CREEK.

Discharge measurements of Gazoo Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Oct. 17, 1893	W. W. Brier	1.85	6 miles above mouth.

GORMAN CREEK.

See Piru Creek, Gorman Creek.

GREEN SPOT PIPE LINE.

See Santa Ana River, Green Spot pipe line.

GRINDSTONE CREEK.

See Stony Creek, Grindstone Creek.

GUBERNADOR CREEK.

Discharge measurement of Gubernador Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.58	

HAT CREEK.

See Pit River, Hat Creek.

HAWS AND TALMAGE DITCH.

See San Bernardino Valley, Haws and Talmage ditch.

HONEY LAKE.

Annual inflow estimated by State engineering department 200,000 acre-feet.

HOUSE CREEK.

See Tejon House Creek.

KAWEAH RIVER.

Discharge measurements of Kaweah River, Tulare County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Nov. 20, 1895	J. B. Lippincott	70	Headworks above upper large power canal.
Sept. 1, 1898	do	35	Do.
Sept. 6, 1899	S. G. Bennett	41	Do.
Sept. 3, 1900	do	78.5	Do.
Nov. 20, 1895	J. B. Lippincott	0	Iron bridge, wagon road.
Aug. 31, 1898	do	0	Southern Pacific branch railroad bridge.
Sept. 1, 1898	do	18	Iron bridge, wagon road.
Sept. 6, 1899	S. G. Bennett	33	Do.
Sept. 3, 1900	do	72	1,000 feet below iron bridge.
Do	do	15	Watumna Canal at head-gate.
Oct. 20, 1901	do	52	Iron bridge, 1,000 feet below.
Do	do	5	Watumna Canal.
Aug. 31, 1898	J. B. Lippincott	8.5	Kaweah irrigation and power ditch (Pogues lower ditch).
Sept. 6, 1899	S. G. Bennett	1.5	Do.
Sept. 3, 1900	do	8.1	Do.
Do	do	1	Myers ditch above Pogues upper ditch.
Aug. 31 1898	J. B. Lippincott	4.5	Pogues upper ditch.
Sept. 6, 1899	S. G. Bennett	4.9	Do.
Sept. 3, 1900	do	6.7	Do.
Sept. 1, 1898	J. B. Lippincott	.3	North Fork at mouth.
Sept. 6, 1899	S. G. Bennett	1.1	Do.
Sept. 1, 1898	J. B. Lippincott	0	South Fork canals.
Sept. 6, 1899	S. G. Bennett	.7	Do.
Sept. 25, 1902	E. T. Perkins	4.3	North Fork at lower end Davis ranch.
Do	do	.7	South Fork, 200 yards above bridge on road to Visalia.
Sept. 26, 1902	do	29	Middle Fork, ¼ mile above Sequoia National Park line.
Sept. 27, 1902	do	20	Middle Fork, 100 yards above junction with Marble Fork.
Do	do	4	Marble Fork, 100 yards above junction with Middle Fork.
Do	do	15	East Fork, ½ mile above headworks Mount Whitney power plant.
Do	do	15.5	East Fork, 200 feet below headworks Mount Whitney power plant.
Sept. 28, 1902	do	11	East Fork, 100 yards below trail from Soldiers' Camp to Tar Gap.

Discharge measurements of Kaweah River, Tulare County—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Sept. 29, 1902	E. T. Perkins	1	South Fork, Horse Creek, at lower end Hackett Meadows.
Do	do	2	South Fork, lower end Sand Meadows.
Sept. 27, 1902	L. M. Lawson	33	¼ mile above iron bridge.
Sept. 29, 1902	do	9.8	South Fork, at Sequoia National Park line.
Sept. 30, 1902	do	31	Middle Fork, 3 miles above Three Rivers.
Sept. 10, 1902	R. McF. Doble	31	Middle Fork, ¼ mile inside Sequoia National Park line.
Sept. 12, 1902	do	18	East Fork (total flow), 1,600 feet from head of Mount Whitney Power Co. flume.

Estimated monthly discharge of Kaweah River at Wachumna Hill, Tulare County.[a]

[Drainage area, 619 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
November [b]	155	9,223	0.25	0.28
December [b]	155	9,531	.25	.29
1879.				
January [c]	248	15,249	.40	.46
February [c]	279	15,495	.45	.47
March [c]	402	24,718	.65	.75
April [c]	867	51,590	1.40	1.56
May [c]	774	47,591	1.25	1.44
June [c]	557	33,144	.90	1.00
July [c]	124	7,624	.20	.23
August [c]	31	1,906	.05	.06
September [b]	31	1,845	.05	.06
October [b]	62	3,812	.10	.12
November [c]	124	7,379	.20	.22
December [c]	279	17,155	.45	.52
The year	315	227,508	.51	6.89

[a] Authority, California State engineering department.
[b] Estimated in part from run-off of neighboring streams.
[c] Based in part on measurements and rod records near Three Rivers.

Estimated monthly discharge of Kaweah River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1880.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January [a]	248	15,249	0.40	0.46
February [a]	310	17,831	.50	.54
March [a]	464	28,530	.75	.86
April [a]	2,352	139,954	3.80	4.24
May [a]	2,786	171,304	4.50	5.19
June [a]	3,900	232,066	6.30	7.02
July [a]	743	45,685	1.20	1.38
August [b]	155	9,531	.25	.29
September [b]	99	5,891	.16	.18
October [b]	50	3,074	.08	.09
November [b]	74	4,403	.12	.13
December [b]	371	22,812	.60	.69
The year	963	696,330	1.56	21.07
1881.				
January [b]	526	32,342	.85	.98
February [b]	774	42,986	1.25	1.30
March [b]	619	38,061	1.00	1.15
April [b]	1,393	82,889	2.25	2.51
May [b]	1,238	76,122	2.00	2.31
June [b]	990	58,909	1.60	1.79
July [a]	371	22,812	.60	.69
August [a]	155	9,531	.25	.29
September [a]	43	2,559	.07	.08
October [a]	74	4,550	.12	.14
November [a]	124	7,379	.20	.22
December [a]	279	17,155	.45	.52
The year	549	395,295	.89	11.98

[a] Based in part on measurements and rod records near Three Rivers.
[b] Estimated in part from run-off of neighboring streams.

Estimated monthly discharge of Kaweah River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth
1882.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January [a]	155	9,531	0.25	0.29
February [a]	310	17,217	.50	.52
March [a]	464	28,530	.75	.86
April [a]	1,393	82,889	2.25	2.51
May [a]	2,228	136,994	3.60	4.15
June [a]	929	55,279	1.50	1.67
July [b]	743	45,685	1.20	1.38
August [b]	198	12,175	.32	.37
September [b]	93	5,534	.15	.17
October [b]	87	5,349	.14	.16
November [b]	124	7,379	.20	.22
December [b]	93	5,718	.15	.17
The year	568	412,280	.92	12.47
1883. [b]				
January	155	9,531	.25	.29
February	124	6,887	.20	.21
March	619	38,061	1.00	1.15
April	805	47,901	1.30	1.45
May	1,021	62,779	1.65	1.90
June	990	58,909	1.60	1.79
July	402	24,718	.65	.75
August	99	6,087	.16	.18
September	74	4,403	.12	.13
October	62	3,812	.10	.12
November	74	4,403	.12	.13
December	74	4,550	.12	.14
The year	375	272,041	.61	8.24

[a] Based in part on measurements and rod records near Three Rivers.
[b] Estimated in part from run-off of neighboring streams.

Estimated monthly discharge of Kaweah River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1884.[a]	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	248	15,249	0.40	0.46
February	2,177	125,222	3.52	3.80
March	2,290	140,807	3.70	4.27
April	1,548	92,112	2.50	2.79
May	2,847	175,055	4.60	5.30
June	4,271	254,142	6.90	7.69
July	3,497	215,022	5.65	6.51
August	990	60,873	1.60	1.84
September	495	29,455	.80	.89
October	248	15,249	.40	.46

[a] Estimated in part from run-off of neighboring streams.

KERN RIVER.

The gaging station on Kern River, established in 1893 by Mr. Walter Jones, chief engineer of the Kern County Land Company, is located at what is known as first point of measurement, 5 miles above Bakersfield. Meter measurements are taken once a week and an automatic gage records daily fluctuations of the river heights. Mr. A. K. Warren, the engineer in charge of this work for the Kern County Land Company, attends to the discharge measurements with much accuracy and precision, and furnishes the Survey with the final results.

Discharge measurements of Kern River, Kern County.

Date.	Hydrographer.	Discharge.	Locality.
		Second-feet.	
Feb. 10, 1897	J. B. Lippincott	314	Calloway Canal at second point of measurement.
July 17, 1898	F. H. Olmsted	5.3	Menache Meadows, Tulare County.
July 10, 1898	do	12.9	South Fork at mouth, Kern County.
July 11, 1898	do	17.9	Do.
July 13, 1898	do	10.1	South Fork, sec. 6–22–36, Kern County.
July 10, 1898	do	331	North Fork at mouth, Kern County.
June 29, 1896	J. B. Lippincott	3,004	First point of measurement.
Aug. 29, 1898	do	116	Do.

Discharge measurements of Kern River, Kern County—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Second-feet.	
Sept. 2, 1899	S. G. Bennett	99	First point of measurement.
Aug. 30, 1900	A. K. Warren	103	Do.
Oct. 7, 1902	L. M. Lawson	171	Do.
Feb. 10, 1897	J. B. Lippincott	322	Calloway Canal at first point of measurement.
Sept. 2, 1899	F. H. Olmsted	99.22	Kern River, first point of measurement.
June 19, 1900	do	1.32	Basin Creek, Rankin's ranch, Walker's basin.
June 20, 1900	do	14.18	South Fork of Kern River, 700 feet above junction.
Do	do	1,333.17	North Fork of Kern River, Hooper's Mill Bridge.
June 21, 1900	do	2.30	Bull Run Creek near mouth.
June 22, 1900	do	2.92	Tobias Creek near mouth.
Do	do	.18	Ant Creek at mouth; elevation, 3,200 feet.
Do	do	3.45	Salmon Creek at mouth.
Do	do	.32	Corral Creek near mouth.
June 23, 1900	do	5.82	South Needles Creek at Needles Peak; elevation, 4,550 feet.
Do	do	5.19	Clark Creek, Dry Meadows.
Do	do	5.74	Jackson Creek, Dry Meadows.
Do	do	5.07	Wade Creek, Dry Meadows.
June 24, 1900	do	4.26	North Needles Creek at Needles Peak.
Do	do	81	Little Kern River at junction with Kern River.
June 25, 1900	do	2.87	Tibbetts Creek, 1 mile above mouth.
Do	do	8.45	Harris Creek at mouth.
Do	do	4.87	One Mile Creek, 1 mile below Kern Lake.
Do	do	1,154.90	North Fork of Kern River, 3,000 feet above junction with Little Kern River.
Do	do	4.72	Whitney Creek at tunnel in divide.
June 27, 1900	do	39.11	Whitney Creek at Lava bridge.
Do	do	17.64	Creek south of Bald Mountain; elevation, 6,560 feet.
Do	do	939.60	North Fork of Kern River, 800 feet above Kern Lake.
June 28, 1900	do	3.67	South Fork of Kern River, Manache Meadows.
June 29, 1900	do	1.80	Tibbetts Creek; elevation, 8,300 feet.

Discharge measurements of Kern River, Kern County—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Second-feet.	
June 29, 1900	F. H. Olmsted	1.04	North Fork of Brush Creek; elevation, 5,800 feet.
Do	do	8.22	Brush Creek above North Fork; elevation, 5,600 feet.
June 30, 1900	do	825.25	North Fork of Kern River, 4,000 feet above junction with South Fork.
Do	do	4.05	Salmon Creek, Horse Meadows; elevation, 7,700 feet.
July 2, 1900	do	11.05	South Fork of Kern River, T. 25 S., R. 35 E., Mount Diablo meridian; elevation, 2,920 feet.
Do	do	2.38	Powers Ditch near head.
July 3, 1900	do	1.96	Neil's Ditch, Isabella.
Do	do	7.31	Hooper's Mill Ditch at gaging station on Kern River.
Oct. 4, 1902	E. T. Perkins	14	Little Kern 100 yards above junction.
Do	do	158	100 yards above junction with Little Kern.
Oct. 6, 1902	do	.5	Brown's upper ditch at road crossing to Hot Springs.
Do	do	7	Brown's main ditch at entrance to weir.
Do	do	1.5	Stafford & Neal ditch above Kernville.
Do	do	7.9	Brown's lower ditch above dairy.
Do	do	160	Power Company's diversion, Kernville.
Oct. 7, 1902	do	224	¼ mile above mouth of Salmon Creek.
Do	do	.5	Salmon Creek 50 yards above junction.
Do	do	127	Above gaging station, Kern River Power Co.
Oct. 8, 1902	do	188	½ mile above powerhouse, Kern River Power Co.
Do	do	236	Below Clear Creek.
Do	do	201	200 yards below junction South Fork.
Do	do	18	South Fork above junction.
Do	do	202	350 yards below bridge from Isabella to Kernville.
Do	do	9	Hooper ditch at bridge from Isabella to Kernville.
Do	do	.6	Lower Stafford ditch ¼ mile north of Staffords ranch.

Discharge measurements of Kern River, Kern County—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Second-feet.	
Oct. 8, 1902	E. T. Perkins	0.7	Lower Murphy ditch 75 yards above Weldon road crossing.
Do	do	7	South Fork at Weldon road crossing.
Oct. 7, 1902	L. M. Lawson	174	½ mile below mouth of canyon.
Do	do	14	Below intake of Power Company's tunnel.
Oct. 8, 1902	do	179	Democrat Springs 200 feet below hotel at springs.

Estimated monthly discharge of Kern River at Rio Bravo ranch, Kern County.[a]

[Drainage area, 2,345 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November			400	23,802	0.17	0.19
December			350	21,521	.15	.17
1879.						
January	686	389	462	28,407	.20	.23
February	745	466	591	32,822	.25	.26
March	659	510	552	33,941	.24	.28
April	1,054	661	764	45,461	.33	.37
May	1,231	680	927	56,999	.40	.46
June	1,190	812	971	57,779	.41	.46
July	865	386	535	32,896	.23	.27
August	387	168	266	16,356	.11	.13
September	174	146	171	10,175	.07	.08
October	210	145	182	11,191	.08	.09
November	325	184	261	15,531	.11	.12
December	650	280	356	21,890	.15	.17
The year	1,231	145	503	363,448	.22	2.92

[a] Authority, California State engineering department, from November, 1878, to October, 1884, inclusive.

Estimated monthly discharge of Kern River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1880.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	410	315	354	21,767	0.15	0.17
February	380	315	370	21,283	.16	.17
March	385	349	389	23,919	.17	.20
April	3,320	395	1,557	92,648	.66	.74
May	3,560	1,615	2,659	163,496	1.13	1.30
June	4,070	2,740	3,317	197,375	1.41	1.57
July	3,140	1,550	2,196	135,027	.94	1.08
August	1,500	840	1,060	65,177	.45	.52
September	846	710	767	45,640	.33	.37
October	794	722	758	46,608	.32	.37
November	830	695	767	45,640	.33	.37
December	1,480	790	1,063	65,361	.45	.52
The year	4,070	315	1,271	923,941	.54	7.38
1881.						
January	1,640	950	1,078	66,284	.46	.53
February	2,970	1,430	1,773	98,467	.76	.79
March	2,100	1,400	1,570	96,536	.67	.77
April	2,612	2,100	2,288	136,145	.98	1.09
May	2,710	2,060	2,362	145,234	1.01	1.16
June	2,390	1,475	1,890	112,463	.81	.90
July	1,520	710	1,126	69,235	.48	.55
August	1,200	420	627	38,553	.27	.31
September	420	320	361	21,481	.15	.17
October	360	310	333	20,475	.14	.16
November	360	300	337	20,053	.14	.16
December	410	320	350	21,521	.15	.17
The year	2,970	300	1,175	846,447	.50	6.76

Estimated monthly discharge of Kern River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1882.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	380	310	335	20,598	0.14	0.16
February	510	360	395	21,937	.17	.18
March	1,260	440	600	36,893	.26	.30
April	1,670	920	1,174	69,858	.50	.56
May	2,000	1,420	1,670	102,684	.71	.82
June	1,990	900	1,306	77,712	.56	.62
July	1,110	450	726	44,640	.31	.36
August			330	20,291	.14	.16
September			330	19,636	.14	.16
October			330	20,291	.14	.16
November [a]			280	16,661	.12	.13
December [a]			280	17,217	.12	.14
The year			646	468,418	.28	3.75
1883.[a]						
January			280	17,217	.12	.14
February			350	19,438	.15	.16
March			700	43,041	.30	.35
April			1,170	69,620	.50	.56
May			1,410	86,697	.60	.69
June			1,170	69,620	.50	.56
July			940	57,798	.40	.46
August			470	28,899	.20	.23
September			350	20,826	.15	.17
October			280	17,217	.12	.14
November			200	11,901	.09	.10
December			200	12,298	.09	.10
The year			627	454,572	.27	3.66

[a] Estimated from previous measurements and from run-off of neighboring steams.

Estimated monthly discharge of Kern River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1884.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			350	21,521	0.15	0.17
February			470	27,035	.20	.22
March			940	57,798	.40	.46
April			1,980	117,818	.84	.94
May			5,860	360,317	2.50	2.88
June			9,380	558,149	4	4.46
July			5,860	360,317	2.50	2.88
August			2,350	144,496	1	1.15
September			940	55,934	.40	.45
October			470	28,899	.20	.23

[a] Estimated from previous measurements and from run-off of neighboring streams.

Estimated monthly discharge of Kern River at first point of measurement.[b]

[Drainage area, 2,345 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1893.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
October	554	517	534	32,861	0.23	0.26
November	559	467	518	30,827	.22	.24
December	590	430	516	31,757	.22	.25
1894.						
January	741	562	661	40,644	.28	.32
February	1,114	604	717	39,817	.30	.32
March	1,443	762	1,001	61,541	.43	.65
April	1,892	1,209	1,495	88,952	.64	.71
May	2,208	1,228	1,607	98,798	.69	.79
June	1,719	871	1,085	64,557	.46	.51
July	1,051	400	700	43,036	.30	.34
August	549	256	335	20,565	.14	.16
September	382	172	248	14,756	.11	.12
October	263	224	279	17,178	.12	.14
November	268	230	244	14,500	.10	.11
December	805	234	470	28,908	.20	.23
The year	2,208	172	737	533,252	.31	4.40

[b] Authority, Kern County Land Company.

Estimated monthly discharge of Kern River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,616	473	809	49,762	0.34	0.40
February	4,762	675	1,252	69,536	.53	.55
March	3,004	987	1,374	84,437	.59	.67
April	3,897	1,911	2,724	162,076	1.16	1.29
May	5,384	3,100	4,369	268,608	1.86	2.14
June	3,721	2,174	2,906	172,919	1.24	1.37
July	2,063	867	1,482	91,113	.63	.73
August	1,073	354	629	38,665	.27	.31
September	676	290	344	20,469	.15	.17
October	612	276	327	20,106	.14	.16
November	436	308	346	20,588	.15	.17
December	447	368	403	24,779	.17	.20
The year	5,384	276	1,413	1,023,058	.60	8.16
1896.						
January	3,101	377	747	45,931	.32	.37
February	798	559	617	35,489	.26	.28
March	2,089	652	951	58,475	.41	.47
April	1,263	766	972	57,838	.41	.46
May	3,370	934	1,401	86,144	.60	.69
June	3,611	1,244	2,456	146,142	1.05	1.17
July	2,210	741	1,316	82,762	.57	.66
August	741	353	486	29,883	.21	.24
September	473	234	304	18,089	.13	.14
October	425	223	267	16,417	.11	.13
November	416	288	355	21,124	.15	.17
December	426	313	347	21,336	.15	.17
The year	3,611	223	854	619,630	.36	4.95

Estimated monthly discharge of Kern River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1897.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	832	305	373	22,935	0.16	0.18
February	2,306	516	809	44,930	.35	.36
March	2,044	688	923	56,753	.39	.45
April	4,410	1,094	2,914	173,395	1.24	1.38
May	5,342	4,054	4,580	281,613	1.95	2.25
June	4,352	1,289	2,309	137,395	.98	1.09
July	1,536	644	1,006	61,857	.43	.49
August	671	338	469	28,838	.20	.23
September	363	260	295	17,554	.13	.14
October	441	278	340	20,906	.15	.17
November	477	289	355	21,124	.15	.17
December	1,023	327	422	25,948	.18	.21
The year	5,342	260	1,234	893,248	.53	7.12
1898.						
January	400	311	363	22,320	.15	.17
February	923	316	434	24,103	.19	.20
March	485	304	388	23,857	.17	.20
April	1,342	371	710	42,247	.30	.33
May	980	560	735	45,193	.31	.36
June	686	394	551	32,786	.23	.26
July	416	127	244	15,003	.10	.12
August	142	86	120	7,378	.05	.06
September	294	80	116	6,902	.05	.06
October	232	127	160	9,838	.07	.08
November	188	136	166	9,877	.07	.08
December	314	147	199	12,236	.08	.09
The year	1,342	80	348	251,743	.15	2.01

Estimated monthly discharge of Kern River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	361	182	263	16,172	0.11	0.13
February	365	258	302	16,772	.13	.14
March	4,932	247	590	36,278	.25	.29
April	1,167	593	893	53,138	.38	.43
May	1,302	576	835	51,342	.36	.41
June	2,230	809	1,331	79,200	.57	.63
July	894	229	489	30,057	.21	.24
August	240	99	156	9,592	.07	.08
September	117	89	105	6,257	.04	.05
October	229	86	160	9,838	.07	.08
November	385	183	221	13,151	.09	.10
December	781	182	277	17,032	1.18	1.36
The year	4,932	86	468	338,829	.29	3.94
1900.						
January	1,048	266	362	22,259	.15	.17
February	329	238	280	15,550	.12	.12
March	502	307	413	25,394	.18	.21
April	592	387	472	28,086	.20	.22
May	1,969	449	1,111	68,312	.47	.54
June	1,878	841	1,283	76,344	.55	.61
July	850	202	392	24,103	.17	.20
August	217	101	144	8,854	.06	.07
September	270	106	166	9,878	.07	.08
October	186	137	160	9,838	.07	.08
November	1,339	161	349	20,767	.15	.17
December	445	288	373	22,934	.16	.18
The year	1,969	101	459	332,319	.20	2.65

Estimated monthly discharge of Kern River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	2,049	226	493	30,313	0.21	0.24
February	1,963	342	860	47,762	.37	.39
March	1,658	901	1,270	78,089	.54	.62
April	2,632	637	1,398	83,187	.60	.67
May	4,419	2,091	3,032	186,430	1.29	1.49
June	4,332	2,455	3,324	197,792	1.42	1.58
July	3,856	1,120	1,864	114,163	.80	.92
August	1,804	505	968	59,520	.41	.47
September	526	249	345	20,529	.15	.17
October	756	259	317	19,492	.14	.16
November	421	343	377	22,433	.16	.18
December	457	268	323	19,860	.14	.16
The year	4,419	226	1,216	880,020	.52	7.05

KING RIVER.

This river rises on the western slope of the Sierra Nevada in Fresno County, Cal. The waters coming from the high catchment basin are probably of greater value for irrigation purposes than those of any other stream in central California, being used exclusively for the raising of grapes and deciduous fruits in the neighborhood of Fresno, Selma, and Hanford. The summer flow of this river is now entirely diverted, and during the dry season of the last few years the scarcity of water has worked many hardships. There is a large surplus of water in this river in the spring, due to the melting of snows, which is now going to waste, and which, if stored in suitable reservoirs, would bring larger areas under cultivation. The mountainous basin of this river has been systematically explored for reservoir sites. For a detailed statement concerning the hydrography of King River, see Water-Supply Paper No. 58, by J. B. Lippincott. Two gaging stations were formerly maintained on the river, one at Red Mountain and the other at Kingsburg, Cal. The station at Red Mountain, established September 3, 1895, is located 15 miles east of Sanger, Cal., and southwest of Red Mountain. The station is on what is called "the lower section of No. 9" of the lumber flume. It is located at the mouth of the canyon, above all diversions. The bed of the stream is of gravel, and few changes have been noticed in the cross section since the establishment of the station.

Discharge measurements of King River, Fresno County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
June 20, 1900	E. G. Hamilton		21.7	Boulder Creek—Crossing of upper trail from Kings River Canyon to Bear-skin Meadow.
Aug. 31, 1898	J. B. Lippincott		164	Church ditch (Fresno Canal), near head.
Sept. 4, 1899	S. G. Bennett		151	Do.
Sept. 4, 1900	do		229	Do.
Sept. 24, 1902	L. M. Lawson		121	Church ditch at road crossing.
Do	do		Dry.	Fowler Switch Canal, near head.
Sept. 4, 1899	S. G. Bennett		Dry.	Do.
Do	do		2	Gould Canal, near head.
Sept. 4, 1900	do		84	Do.
Sept. 27, 1900	do		1	Do.
Sept. 4, 1899	do		.3	Kingsburg Canal at head.
Sept. 4, 1900	do		Dry.	Do.
Sept. 24, 1902	L. M. Lawson		4.8	Kingsburg Canal at road crossing.
Sept. 17, 1902	E. T. Perkins		3.5	Dinkey Creek, 75 yards below bridge.
Do	do		1.5	Bear Creek.
Do	do		1.5	Deer Creek.
Sept. 18, 1902	do		7.2	North Fork, 100 yards above trail crossing.
Do	do		3	North Fork Creek below Crown Meadow.
Do	do		5	North Fork, Crown Creek.
Do	do		2	North Fork, Blue Canyon Creek.
Do	do		75	Middle Fork at Simpson Meadow.
Sept. 22, 1902	do		32	Bubbs Creek, 100 yards above junction.
Do	do		29	South Fork, 100 yards below trail crossing.
Do	do		.7	Granite Creek, 50 yards above bridge on trail crossing.
Do	do		1.5	Copper Creek.
Sept. 23, 1902	do		11	Roaring Creek at trail crossing.
Sept. 22, 1902	L. M. Lawson		35	North Fork at mouth.
Sept. 24, 1902	do		31	'76 Canal at Trimmer Springs road crossing.

Discharge measurements of King River, Fresno County—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Sept. 22, 1902	L. M. Lawson		2	Enterprise Canal at Trimmer Springs road crossing.
Sept. 25, 1902	do		74	At bridge, 1 mile north of Reedley.
Jan. 10, 1895	A. P. Davis	6	1,830	Kingsburg.[a]
Mar. 23, 1895	J. B. Lippincott	4.1	500	Do.
Dec. 2, 1895	do	3.3	407	Do.
Apr. 11, 1896	J. A. Vogelson	5.7	1,883	Do.
Feb. 11, 1897	J. B. Lippincott	5.6	905	Do.
Apr. 6, 1897	do	5.2	825	Do.
June 3, 1897	do	8.6	5,959	Do.
July 17, 1897	do	5.2	503	Do.
Sept. 10, 1897	A. Q. Campbell	3.2	221	Do.
Nov. 3, 1897	do	4.8	465	Do.
Dec. 23, 1897	J. B. Lippincott	4.8	522	Do.
May 28, 1898	do	6.2	1,026	Do.
Apr. 21, 1898	do	6.6	1,658	Do.
July 26, 1898	do	3.9	305	Do.
Aug. 30, 1898	do	3.4	94	Do.
Sept. 26, 1902	L. M. Lawson		117	Do.
June 19, 1900	E. G. Hamilton		11.6	Long Valley, 300 feet below junction of Tenmile Creek.
Aug. 26, 1900	H. E. Green		153	Middle Fork at Tehipiti.
May 23, 1900	E. G. Hamilton		6.8	Mill Creek, sec. 13, T. 13 S., R. 24 E.
Aug. 19, 1900	do		4.3	North Fork, Dusy Meadows.
Sept. —, 1900	J. S. Eastwood		15	North Fork.
Sept. 3, 1895	A. P. Davis	4.3	524	Red Mountain.
Nov. 24, 1895	J. B. Lippincott	3.8	248	Do.
Apr. 12, 1896	J. A. Vogelson	6.35	1,745	Do.
June 12, 1896	J. B. Lippincott	10.85	15,941	Do.
Nov. 1, 1896	do	4.2	404	Do.
Feb. 13, 1897	do	5.2	1,021	Do.
Apr. 5, 1897	do	6.82	2,047	Do.
June 1, 1897	do	10.02	8,838	Do.
July 15, 1897	A. Q. Campbell	7.17	3,333	Do.
Sept. 9, 1897	do	4.1	295	Do.

[a] Grade of river at Kingsburg affected by diversion dam of Last Chance Company, 2 miles below.

Discharge measurements of King River, Fresno County—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Nov. 1, 1897	A. Q. Campbell	4.57	552	Red Mountain.
Dec. 22, 1897	J. B. Lippincott	4.7	515	Do.
Apr. 20, 1898	do	8.55	4,943	Do.
May 29, 1898	do	7.14	2,672	Do.
July 27, 1898	do	4.32	503	Do.
Aug. 31, 1898	do	3.77	244	Do.
Dec. 21, 1898	do	7.0	2,444	Do.
Apr. 19, 1899	S. G. Bennett	8.8	5,409	Do.
May 15, 1899	do	8.15	4,422	Do.
June 3, 1899	do	7.85	3,954	Do.
June 26, 1899	do	7.23	3,049	Do.
Aug. 2, 1899	do	4.66	608	Do.
Sept. 4, 1899	do	3.80	206	Do.
Dec. 8, 1899	J. B. Lippincott	4.36	458	Do.
Apr. 4, 1900	S. G. Bennett	6.54	2,035	Do.
May 16, 1900	do	9.2	6,436	Do.
June 19, 1900	do	8.59	5,072	Do.
Aug. 10, 1900	do	4.3	427	Do.
Sept. 4, 1900	do	4.28	405	Do.
Sept. 27, 1900	do	3.82	220	Do.
Dec. 29, 1900	do	4.65	576	Do.
Jan. 31, 1901	do	5.4	991	Do.
Feb. 28, 1901	do	7.90	3,593	Do.
Apr. 4, 1901	do	6.40	1,915	Do.
May 21, 1901	J. B. Lippincott	10.5	10,869	Do.
July 30, 1901	S. G. Bennett	7.54	3,179	Do.
Oct. 17, 1901	do	4.1	301	Do.
Sept. 21, 1902	do		217	Do.
Oct. 20, 1900	H. E. Green		346	South Fork, just below junction of Middle Fork.
Sept. 4, 1899	S. G. Bennett		Dry.	"76" ditch at head.
Sept. 4, 1900	do		Dry.	Do.
June 25, 1895	J. B. Lippincott	13.9	10,307	Suspension bridge.
Sept. 2, 1895	A. P. Davis	9.5	525	Do.
Dec. 23, 1897	J. B. Lippincott	4.9	522	Do.

Estimated monthly discharge of King River at Slate Point, Fresno County.[a]

[Drainage area, 1,742 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	300	17,851	0.17	0.19
December	290	17,831	.17	.20
1879.				
January	370	22,750	.21	.24
February	870	48,317	.50	.52
March	1,970	121,131	1.13	1.30
April	4,750	282,645	2.73	3.05
May	5,090	312,972	2.92	3.37
June	3,760	223,736	2.16	2.41
July	1,650	101,455	.95	1.10
August	380	23,365	.22	.25
September	270	16,066	.15	.17
October	280	17,217	.16	.18
November	400	23,802	.23	.26
December	1,440	88,542	.83	.96
The year	1,769	1,281,998	1.02	13.81
1880.				
January	720	44,271	.41	.47
February	1,040	59,821	.60	.65
March	1,120	68,866	.64	.74
April	5,230	311,207	3.00	3.35
May	7,120	437,792	4.09	4.71
June	9,540	567,669	5.48	6.12
July	4,800	295,141	2.76	3.18
August	1,150	70,711	.66	.76
September	370	22,017	.21	.23
October	220	13,527	.13	.15
November	220	13,091	.13	.15
December	510	31,359	.29	.33
The year	2,670	1,935,472	1.53	20.84

[a] Authority, California State engineer.

Estimated monthly discharge of King River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1881.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	870	53,494	0.50	0.58
February	2,430	134,955	1.39	1.45
March	1,900	116,826	1.09	1.26
April	5,800	345,124	3.33	3.71
May	8,220	505,428	4.72	5.44
June	5,010	298,116	2.88	3.21
July	4,790	294,526	2.75	3.17
August	650	39,967	.37	.43
September	340	20,231	.20	.22
October	250	15,372	.14	.16
November	230	13,686	.13	.15
December	260	15,987	.15	.17
The year	2,562	1,853,712	1.47	19.95
1882.				
January	380	23,365	.22	.25
February	440	24,436	.25	.26
March	1,250	76,859	.72	.83
April	3,170	188,628	1.82	2.03
May	9,190	565,071	5.28	6.08
June	6,410	381,421	3.68	4.11
July	2,020	124,205	1.16	1.34
August	620	38,122	.36	.42
September	390	23,207	.22	.25
October	610	37,507	.35	.40
November	470	27,967	.27	.30
December	340	20,906	.20	.23
The year	2,107	1,531,694	1.21	16.46

Estimated monthly discharge of King River, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1883.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	320	19,676	0.18	0.21
February	340	18,883	.20	.21
March	1,050	64,562	.60	.69
April	2,220	132,099	1.27	1.42
May	6,700	411,967	3.85	4.44
June	6,730	400,463	3.86	4.31
July	1,460	89,772	.84	.97
August	600	36,893	.34	.39
September	480	28,562	.28	.31
October	420	25,825	.24	.28
November	260	15,471	.15	.17
December	220	13,527	.13	.15
The year	1,733	1,257,700	.99	13.55
1884.				
January	430	26,440	.25	.29
February	2,620	150,704	1.50	1.62
March	3,610	221,970	2.07	2.39
April	3,370	200,529	1.93	2.15
May	9,210	566,301	5.29	6.09
June	17,630	1,049,058	10.12	11.29
July	13,210	812,251	7.58	8.74
August	3,570	219,511	2.05	2.36
September	880	52,364	.51	.57
October	900	55,339	.52	.60

Estimated monthly discharge of King River at Red Mountain, Fresno County.[a]

[Drainage area, 1,742 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
September	3,920	360	778	46,294	0.45	0.50
October	520	320	371	22,812	.21	.24
November	1,834	250	368	21,898	.21	.23
December	520	250	328	20,168	.19	.22
The year	3,920	250	461	111,172	.27	1.19
1896.						
January	11,020	390	1,474.8	90,682	.85	.98
February	1,140	728	825.4	47,477	.47	.51
March	7,020	820	1,710.6	105,181	.98	1.13
April	4,600	390	1,938.5	115,349	1.11	1.24
May	22,100	1,140	5,918.1	363,890	3.40	3.90
June	18,920	5,160	12,737.3	757,922	7.31	8.15
July	6,680	1,212	3,742.2	230,110	2.15	2.48
August	1,212	590	795.9	48,938	.45	.52
September	590	390	491.3	29,234	.28	.31
October	510	310	350	21,520	.20	.23
November	1,076	390	538.5	32,043	.31	.35
December	550	470	498.4	30,645	.29	.33
The year	22,100	310	2,585.1	1,872,991	1.48	20.13
1897.						
January	624	360	437	26,870	.25	.29
February	6,344	1,100	1,631	90,581	.92	.96
March	4,408	1,240	1,884	115,843	1.06	1.22
April	9,380	1,930	5,318	316,442	2.99	3.33
May	22,732	6,344	14,470	889,731	8.15	9.40
June	10,580	2,520	6,145	365,652	3.45	3.87
July	4,040	1,036	2,177	133,859	1.22	1.41
August	1,100	440	739	45,440	.42	.47
September	480	250	329	19,577	.18	.20
October	572	270	394	24,226	.22	.25
November	2,520	360	692	41,177	.39	.44
December	8,348	572	985	60,566	.55	.63
The year	22,732	250	2,933	2,129,964	1.65	22.47

[a] Authority, United States Geological Survey.

Estimated monthly discharge of King River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1898.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	624	440	506	31,113	0.29	0.33
February	1,170	480	705	39,154	.40	.41
March	1,170	520	895	55,032	.50	.58
April	7,820	1,036	3,547	211,061	2.00	2.23
May	6,520	2,450	3,536	217,422	1.99	2.29
June	3,280	1,310	2,122	126,267	1.20	1.34
July	1,310	440	696	42,796	.39	.45
August	400	215	320	19,676	.18	.21
September	780	145	204	12,139	.12	.13
October	728	215	320	19,676	.18	.21
November	285	215	231	13,745	.13	.14
December	1,450	180	315	19,369	.18	.21
The year	7,820	145	1,116	807,450	.63	8.53
1899.						
January	1,310	250	513	31,543	.29	.33
February	1,036	440	660	36,655	.37	.39
March	20,200	624	2,165	133,121	1.22	1.41
April	7,300	1,834	4,512	268,483	2.54	2.83
May	4,780	1,450	3,568	219,388	2.01	2.32
June	10,300	2,852	6,077	361,607	3.42	3.81
July	2,852	676	1,411	86,759	.79	.91
August	624	250	411	25,271	.23	.26
September	285	180	215	12,793	.12	.13
October	1,205	180	378	23,242	.21	.24
November	1,240	345	638	37,964	.36	.40
December	5,096	400	991	60,934	.56	.64
The year	20,200	180	1,795	1,297,760	1.01	13.67

Estimated monthly discharge of King River, etc.—Continued.

Month.	Discharge.			Total discharge	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1900.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	12,700	849	1,689	103,853	0.97	1.12
February	849	676	748	41,542	.43	.45
March	2,584	728	1,712	105,267	.98	1.13
April	2,852	1,546	2,098	124,840	1.20	1.34
May	9,400	1,930	5,881	361,609	3.38	3.90
June	7,900	2,986	5,127	305,078	2.94	3.27
July	2,584	572	1,278	78,581	.73	.84
August	624	250	398	24,472	.23	.26
September	520	215	301	17,911	.17	.19
October	440	215	309	19,000	.18	.21
November	15,700	250	1,310	77,950	.75	.83
December	972	572	726	44,640	.42	.48
The year	15,700	215	1,798	1,304,743	1.03	14.02
1901.						
January	43,930	520	4,337	266,672	2.49	2.87
February	7,040	1,040	3,319	190,392	1.90	2.00
March	4,490	2,034	2,965	182,311	1.70	1.96
April	10,840	1,642	4,492	267,293	2.58	2.87
May	21,830	5,548	11,093	682,082	6.37	7.36
June	21,180	7,040	14,363	854,658	8.25	9.20
July	13,240	3,280	6,258	384,789	3.59	4.14
August	6,260	728	2,292	140,930	1.32	1.52
September	780	440	534	31,775	.31	.35
October	2,034	360	535	32,896	.31	.36
November	1,450	480	694	41,296	.40	.45
December	1,170	440	668	41,073	.38	.44
The year	43,930	360	4,296	3,116,167	2.47	33.52

Estimated monthly discharge of King River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1902.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	520	360	440	27,055	0.25	0.29
February	2,852	360	665	36,932	.38	.40
March	4,490	1,040	1,422	87,312	.82	.95
April	26,380	1,450	4,163	247,716	2.39	2.67
May	13,760	3,440	6,532	401,637	3.75	4.32
June	13,240	3,760	8,063	479,782	4.63	5.16
July	3,600	1,040	1,638	100,717	.94	1.08
August	910	320	626	38,491	.36	.42
September	360	250	304	18,089	.17	.19
October	520	215	265	16,294	.15	.17
November	1,170	250	451	26,836	.26	.29
December	1,040	400	497	30,559	.29	.33
The year	26,380	215	2,089	1,511,420	1.20	16.27

LITTLE ROCK CREEK.

Discharge measurements of Little Rock Creek, Los Angeles County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
June 2, 1896	J. B. Lippincott	2	Head works Little Rock irrigation district.
Apr. 20, 1896	J. A. Vogelson	7.2	Head works South Antelope Valley Water Company.
June 2, 1896	J. B. Lippincott	1	Do.
Feb. 9, 1897	do	21.3	Do.
Apr. 7, 1897	do	120	Do.
Jan. 5, 1898	do	3	Do.
July 19, 1900	B. Cole	1.4	Pumped water in ciénaga.

LOBETUS CREEK.

Discharge measurement of Lobetus Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Oct. 17, 1893	W. W. Brier	0.18	1 mile above mouth.

LOGSDON AND FARREL DITCH, SAN BERNARDINO COUNTY.

See San Bernardino Valley, Logsdon and Farrel ditch.

LOMA ABAJO.

The Loma Abajo was measured by Charles J. Johansen for the Pacific Improvement Company, as indicated below. The point of measurement was a short distance above the junction with the Gato. At the time of these measurements no water was flowing in the pipe line from the Loma Abajo to the Ontare ranch.

List of discharge measurements of Loma Abajo River in Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Feb. 7, 1890	Charles J. Johansen	3.84	Above junction with Gato.
Feb. 14, 1890	do	3.00	Do.
Feb. 27, 1890	do	5.67	Do.
Mar. 2, 1890	do	3.21	Do.
Mar. 4, 1890	do	3.00	Do.
Mar. 6, 1890	do	2.80	Do.
Mar. 9, 1890	do	2.80	Do.
Mar. 11, 1890	do	2.24	Do.
Mar. 13, 1890	do	2.06	Do.
Mar. 15, 1890	do	2.06	Do.
Mar. 17, 1890	do	1.88	Do.
Mar. 21, 1890	do	1.88	Do.
Mar. 23, 1890	do	1.88	Do.
Mar. 25, 1890	do	1.55	Do.
Mar. 27, 1890	do	1.55	Do.
Mar. 29, 1890	do	1.55	Do.
Mar. 31, 1890	do	1.39	Do.
Apr. 2, 1890	do	1.39	Do.
Apr. 4, 1890	do	1.39	Do.
Apr. 6, 1890	do	1.23	Do.
Apr. 8, 1890	do	1.23	Do.
Apr. 10, 1890	do	1.08	Do.
Apr. 12, 1890	do	1.23	Do.
Apr. 14, 1890	do	1.08	Do.
Apr. 17, 1890	do	.92	Do.
Apr. 18, 1890	do	.76	Do.
Apr. 20, 1890	do	.76	Do.
Apr. 22, 1890	do	.76	Do.
Apr. 24, 1890	do	.76	Do.
Apr. 26, 1890	do	.76	Do.

List of discharge measurements of Loma Abajo River, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Apr. 28, 1890	Charles J. Johansen	0.76	Above junction with Gato.
Apr. 30, 1890	do	.76	Do.
May 2, 1890	do	.76	Do.
May 4, 1890	do	.68	Do.
May 6, 1890	do	.68	Do.
May 8, 1890	do	.60	Do.
May 10, 1890	do	.60	Do.
May 12, 1890	do	.60	Do.
May 14, 1890	do	.46	Do.
May 16, 1890	do	.60	Do.
May 18, 1890	do	.53	Do.
May 20, 1890	do	.53	Do.
May 20, 1890	do	.74	Do.
May 22, 1890	do	.59	Do.
May 24, 1890	do	.59	Do.
May 26, 1890	do	.61	Do.
May 28, 1890	do	.61	Do.
May 30, 1890	do	.59	Do.
June 1, 1890	do	.58	Do.
June 3, 1890	do	.49	Do.
June 5, 1890	do	.49	Do.
June 7, 1890	do	.44	Do.
June 9, 1890	do	.47	Do.
June 11, 1890	do	.47	Do.
June 13, 1890	do	.42	Do.
June 15, 1890	do	.50	Do.
June 17, 1890	do	.56	Do.
June 19, 1890	do	.52	Do.
June 21, 1890	do	.49	Do.
June 23, 1890	do	.42	Do.
June 25, 1890	do	.45	Do.
June 27, 1890	do	.42	Do.
June 29, 1890	do	.37	Do.
July 1, 1890	do	.34	Do.
July 3, 1890	do	.42	Do.
July 5, 1890	do	.26	Do.
July 7, 1890	do	.24	Do.
July 9, 1890	do	.23	Do.
July 11, 1890	do	.24	Do.
July 13, 1890	do	.24	Do.

List of discharge measurements of Loma Abajo River, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
July 15, 1890	Charles J. Johansen	0.24	Above junction with Gato.
July 17, 1890	do	.20	Do.
July 19, 1890	do	.23	Do.
July 21, 1890	do	.17	Do.
July 23, 1890	do	.20	Do.
July 25, 1890	do	.18	Do.
July 27, 1890	do	.21	Do.
July 29, 1890	do	.21	Do.
July 31, 1890	do	.23	Do.
Aug. 2, 1890	do	.24	Do.
Aug. 4, 1890	do	.26	Do.
Aug. 6, 1890	do	.20	Do.
Aug. 8, 1890	do	.18	Do.
Aug. 10, 1890	do	.24	Do.
Aug. 12, 1890	do	.27	Do.
Aug. 14, 1890	do	.30	Do.
Aug. 17, 1890	do	.12	Do.
Aug. 19, 1890	do	.13	Do.
Aug. 21, 1890	do	.17	Do.
Aug. 23, 1890	do	.11	Do.
Aug. 25, 1890	do	.12	Do.
Aug. 27, 1890	do	.12	Do.
Aug. 29, 1890	do	.11	Do.
Aug. 31, 1890	do	.09	Do.
Sept. 2, 1890	do	.07	Do.
Sept. 4, 1890	do	.08	Do.
Sept. 6, 1890	do	.12	Do.
Sept. 8, 1890	do	.06	Do.
Sept. 10, 1890	do	.09	Do.
Sept. 12, 1890	do	.07	Do.
Sept. 14, 1890	do	.09	Do.
Sept. 16, 1890	do	.09	Do.
Sept. 18, 1890	do	.11	Do.
Sept. 20, 1890	do	.08	Do.
Sept. 22, 1890	do	.09	Do.
Sept. 24, 1890	do	.12	Do.
Sept. 26, 1890	do	.13	Do.
Sept. 28, 1890	do	.14	Do.
Sept. 30, 1890	do	.30	Do.
Oct. 2, 1890	do	.20	Do.

List of discharge measurements of Loma Abajo River, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Oct. 4, 1890	Charles J. Johansen	0.14	Above junction with Gato.
Oct. 6, 1890	do	.14	Do.
Aug. 18, 1890, a. m	do	.07	Below Upper Forks.
Aug. 18, 1890, p. m	do	.04	Do.
Aug. 21, 1890, a. m	do	.11	Do.
Aug. 21, 1890, p. m	do	.04	Do.
May 21, 1890	do	.46	Upper Forks—East Fork.
Do	do	.07	Upper Forks—West Fork.
June 4, 1890	do	.31	Upper Forks—East Fork.
Do	do	.06	Upper Forks—West Fork.

LOPEZ CREEK.

Discharge measurements of Lopez Creek, San Luis Obispo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Nov. 19, 1897	W. W. Brier	5.51	10 miles above Arroyo Grande.

LOS ANGELES RIVER.

Los Angeles River heads immediately south of Santa Clara River, its various tributaries receiving their supply from the mountains surrounding the San Fernando Plains. It passes out of the lower end of the plain through a narrow valley known as The Narrows, at the lower end of which is the city of Los Angeles. The streams entering San Fernando Valley have brought down immense quantities of sand and gravel from the mountainous area, and thus have formed the San Fernando Plains. This coarse deposit acts as a natural regulator, absorbing the flood waters, which gradually appear lower down. The rainfall of Southern California has been deficient for the last few years, but the discharge of Los Angeles River at The Narrows has been exceptionally constant, the decrease in 1900 being not more than 20 per cent of the average. On account of the numerous lawsuits which have arisen regarding water rights on this river, a thorough study of its discharge has been instituted by the city of Los Angeles, the work being under the direction of J. B. Lippincott, as consulting

engineer for the city. The majority of the measurements have been made by C. A. Miller, although a number of them were made by F. H. Olmsted, city engineer. Several weirs have been placed in the river where the measurements are made. The points of measurement are as follows, in order downstream:

Weir A, at the intersection of Pacoima avenue with Los Angeles River, in the Lankershim Rancho subdivision.

Weir B, at the intersection of Vineland avenue with Los Angeles River.

Weir C, at the intersection of Fernando avenue with Los Angeles River.

Weir E, at the southwest corner of block 73, Providencia Rancho.

Weir G, at the intersection of the east line of block 71, Providencia Rancho, with Los Angeles River.

Weir L, 770 feet above weir H.

Weir H, approximately 300 feet east of the intersection of Buena Vista street with Los Angeles River.

Weir I, 2,543 feet below weir H.

Weir J, 600 feet east of the west line of block 69, Providencia Rancho.

Weir K, in block 79, Providencia Rancho, 300 feet west of center.

Measuring bridge P, near the southwest corner of block 81, Providencia Rancho, in the headworks site of the city of Los Angeles, commonly known as the Pomeroy & Hooker tract, where river turns to the east at angle of 90°.

Measuring bridge Q, about 400 feet above the junction of the Verdugo Wash with Los Angeles River.

Measuring bridge No. 2, about 600 feet above the head of the power ditch of the Los Angeles City Water Company, in the so-called Crystal Springs tract.

Weir No. 7, 1 mile below the head, in the main supply ditch, sometimes called the Woolen Mill ditch, in the headworks site.

Measuring point No. 7B, at a 3-foot cement pipe in the same ditch, west of bridge No. 2 and at the Los Felix ranch house.

Weir No. 17, opposite bridge No. 2, on what is called the Glassell tributary.

To get the total flow of river at bridge No. 2, there should be combined the flow at bridge No. 2, weir No. 17, and measuring point No. 7B. In case measurements were not taken on the main supply ditch at No. 7B, the measurement observed at weir No. 7, above No. 7B on the main supply ditch, was used, and the loss between No. 7 and No. 7B, 2.49 second-feet, was deducted. This is shown in detail in the table for bridge No. 2. For bridge Q a similar process is followed, omitting No. 17. For bridge P the observed flow at the bridge is combined with either the flow at No. 7 or at No. 7B.

Weir No. 9, at the mouth of Tujunga Creek, near the western end of the headworks site, and near the intersection of Buena Vista street with Los Angeles River.

Weir No. 10, approximately 200 feet west of weir No. 9, at the outlet of a small cut which was run into the gravel bed for the development of water.

Weir M, block 67, Providencia Rancho, on a small stream entering the river in the headworks tract.

Discharge measurements of Los Angeles River.

AT WEIR A.

Date.	Discharge.	Average for month.	Date.	Discharge.	Average for month.
1899.	*Sec.-feet.*	*Sec.-feet.*	1900.	*Sec.-feet.*	*Sec.-feet.*
August 14	0.565	0.612	May 17	0.461	0.461
August 19	.660		June 12	.461	.431
September 20	.500	.500	June 29	.402	
September 26	.500		August 1	.310	.370
October 24	.687	.687	August 8	.368	
November 24	.725	.723	August 15	.372	
November 28	.721		August 31	.430	
December 7	.678	.723	September 8	.378	.368
December 28	.768		September 11	.400	
			September 27	.328	
			November 10	.380	.380
Mean		.649	Mean		.402

AT WEIR B.

1899.			1900.		
August 14	0.500	0.500	May 17	0.482	0.482
September 20	.500	.500	June 12	.430	.355
September 26	.500		June 29	.280	
October 24	.755	.755	July 27	.160	.160
November 24	.937	.939	August 1	.180	.198
November 28	.941		August 15	.197	
December 7	.864	.923	August 31	.219	
December 28	.982		September 8	.209	.203
			September 11	.223	
			September 27	.176	
			November 10	.260	.260
Mean		.723	Mean		.276

Discharge measurements of Los Angeles River—Continued.

AT WEIR C.

Date.	Discharge.	Average for month.	Date.	Discharge.	Average for month.
1899.	*Sec.-feet.*	*Sec.-feet.*	1900.	*Sec.-feet.*	*Sec.-feet.*
August 14	2.88	2.88	May 17	2.98	2.98
August 28	2.88		June 12	2.91	2.91
September 20	2.69	2.48	July 27	2.45	2.45
September 26	2.26		August 1	2.50	2.50
October 9	2.88	2.93	August 8	2.48	
October 24	2.98		August 15	2.48	
November 24	3.45	3.43	August 31	2.55	
November 28	3.42		September 8	1.58	1.86
December 28	3.44	3.44	September 11	2.38	
			September 27	1.63	
			November 10	2.42	2.42
Mean		3.03	Mean		2.52

AT WEIR E.

1899.			1900.		
August 14	5.55	5.55	May 15	5.45	5.45
August 28	5.55		June 12	5.18	4.99
September 20	5.35	5.30	June 29	4.81	
September 26	5.25		July 12	4.80	4.80
October 25	5.99	5.99	July 27	4.80	
November 17	6.53	6.38	August 1	4.53	4.63
November 28	6.24		August 15	4.47	
December 13	6.24	6.26	August 31	4.88	
December 21	6.24		September 8	4.49	4.48
December 26	6.30		September 11	4.65	
			September 27	4.30	
			November 10	4.67	4.67
Mean		5.89	Mean		4.84

Discharge measurements of Los Angeles River—Continued.

AT WEIR G.

Date.	Discharge.	Average for month.	Date.	Discharge.	Average for month.
1899.	*Sec.-feet.*	*Sec.-feet.*	1900.	*Sec.-feet.*	*Sec.-feet.*
August 14	7.92	7.92	May 15	7.94	7.94
August 28	7.92		June 12	7.63	7.31
September 20	7.60	7.60	June 29	7.00	
September 26	7.60		July 27	6.45	6.45
October 9	7.66	8.13	August 1	6.45	6.70
October 25	8.60		August 15	6.80	
November 17	9.17	9.08	August 31	6.87	
November 28	8.99		September 8	6.72	6.80
December 13	8.90	8.90	September 11	7.00	
December 21	8.90		September 27	6.68	
December 26	8.92		November 13	6.99	6.99
Mean		8.33	Mean		7.03

AT WEIR L.

1899.			1900.		
August 14	9.08	9.00	May 15	8.85	8.79
August 28	8.93		May 23	8.73	
September 20	8.59	8.74	June 12	8.62	8.46
September 26	8.89		June 29	8.30	
October 9	8.59	9.22	July 27	7.53	7.53
October 25	9.58		August 1	7.53	7.71
October 27	9.48		August 8	7.59	
November 17	10.15	10.04	August 15	7.69	
November 28	9.93		August 31	8.02	
December 13	10.02	10.11	September 8	7.82	7.92
December 21	10.02		September 11	8.20	
December 26	10.30		September 27	7.76	
			November 10	8.34	8.34
Mean		9.42	Mean		8.12

Discharge measurements of Los Angeles River—Continued.

AT WEIR H.

Date.	Discharge.	Average for month.	Date.	Discharge.	Average for month.
1899.	*Sec.-feet.*	*Sec.-feet.*	1900.	*Sec.-feet.*	*Sec.-feet.*
August 14	11.88	12.04	May 15	11.42	11.31
August 28	12.19		May 23	11.21	
September 20	11.60	11.82	June 12	11.01	10.84
September 26	12.03		June 29	10.68	
October 9	11.60	12.31	July 27	9.96	9.96
October 25	12.66		August 1	9.96	10.20
October 27	12.66		August 8	10.16	
November 17	13.73	13.60	August 15	10.13	
November 28	13.47		August 31	10.57	
December 13	13.42	13.62	September 8	10.15	10.19
December 21	13.64		September 11	10.39	
December 26	13.80		September 27	10.03	
			November 10	10.54	10.54
Mean		12.68	Mean		10.51

AT WEIR I.

1899.			1900.		
August 14	17.18	17.04	May 15	16.25	16.15
August 28	16.91		May 23	16.05	
September 20	17.15	17.23	June 12	15.66	15.57
September 26	17.32		June 29	15.49	
October 9	17.19	17.76	July 12	15.58	15.16
October 25	18.33		July 27	14.74	
November 17	19.04	18.88	August 1	14.37	14.70
November 28	18.72		August 8	14.94	
December 13	18.93	18.96	August 15	14.69	
December 26	18.99		August 31	14.80	
			September 8	14.54	14.53
			September 11	14.74	
			September 27	14.31	
			November 10	14.92	14.92
Mean		17.97	Mean		15.17

Discharge measurements of Los Angeles River—Continued.

AT WEIR J.

NOTE.—Total discharge of river at weir J equals discharge over weir + discharge at No. 7, or + No. 7B + 2.49.

Date.	Discharge at No. 7, or No. 7B+2.49.	Discharge over weir.	Total discharge for weir.	Average for month.
1899.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Second-feet.*
August 14	18.59	0.55	19.14	18.76
August 28	17.90	.49	18.39	
September 20	17.90	.49	18.39	18.58
September 26	18.28	.49	18.77	
October 9	18.08	.44	18.52	18.91
October 25	17.45	1.85	19.30	
November 17	18.02	2.91	20.93	20.71
November 28	13.78	6.71	20.49	
December 13	13.90	6.34	20.24	20.31
December 26	13.66	6.73	20.39	
Mean				19.45
1900.				
May 15	20.09	1.39	21.48	19.76
May 23	16.37	1.67	18.04	
June 12	19.81	.86	20.67	18.92
June 29	16.31	.86	17.17	
August 15	18.49	.41	18.90	19.31
August 31	19.25	.46	19.71	
September 8		.42		
September 11	19.81	.52	20.33	19.15
September 27	17.59	.39	17.98	
November 10	14.84	1.49	16.33	16.33
Mean				18.69

Discharge measurements of Los Angeles River—Continued.

AT WEIR K.

NOTE.—Total discharge of river at weir K equals discharge over weir + discharge at No. 7, or + No. 7B + 2.40.

Date.	Discharge at No. 7, or No. 7B+2.49.	Discharge over weir.	Total discharge for weir.	Average for month.
1899.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Second-feet.*
August 14	18.59	4.13	22.72	22.27
August 28	17.90	3.92	21.82	
September 20	17.90	3.91	21.81	22.03
September 26	18.28	3.98	22.26	
October 9	18.08	4.13	22.21	22.68
October 25	17.45	5.70	23.15	
November 17	18.02	6.97	24.99	24.73
November 28	13.78	10.69	24.47	
December 13	13.90	10.69	24.59	24.58
December 26	13.66	10.92	24.58	
Mean				23.26
1900.				
May 15	20.09	4.94	25.03	23.17
May 23	16.37	4.94	21.31	
July 2	16.32	2.93	19.25	19.25
August 1		2.55		
August 15	18.49	2.71	21.20	21.50
August 31	19.25	2.55	21.80	
September 8		2.81		
September 11	19.81	2.80	22.61	21.35
September 27	17.59	2.50	20.09	
November 10	14.84	4.12	18.96	18.96
Mean				20.85

Discharge measurements of Los Angeles River—Continued.

AT BRIDGE P.

NOTE.—Total discharge of river at bridge P equals discharge at bridge + discharge at No. 7, or + discharge at No. 7B.

Date.	Discharge at No. 7, or No. 7B.	Discharge at bridge.	Total discharge at bridge.	Average for month.
1899.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
August 25	18.66	20.22	38.88	38.88
September 20	17.90	19.36	37.26	38.50
September 27	18.66	21.08	39.74	
October 10	18.08	19.81	37.89	37.16
October 25	17.45	17.62	35.07	
October 28	17.45	21.06	38.51	
November 17	18.02	25.73	43.75	42.34
November 28	13.18	27.75	40.93	
December 13	13.90	31.94	45.84	43.58
December 26	13.66	27.67	41.33	
Mean				40.09
1900.				
May 15	17.60	21.22	38.82	36.49
May 23	13.88	20.28	34.16	
June 12	17.32	18.59	35.91	35.91
July 2	13.83	19.51	33.34	32.16
July 12	14.00	16.99	30.99	
August 1	14.00	17.04	31.04	33.23
August 8	14.00	18.71	32.71	
August 15	16.00	19.94	35.94	
September 8		19.26		
September 11	17.32	19.67	36.99	35.23
September 28	15.10	18.38	33.48	
Mean				34.60

Discharge measurements of Los Angeles River—Continued.

AT BRIDGE Q.

Note.—Total discharge of river at bridge Q equals discharge at Q + discharge at No. 7—2.49, or + No. 7B.

Date.	Discharge at No. 7–2.49, or 7B.	Discharge at bridge.	Total discharge at bridge.	Average for month.
1899.	*Second-feet.*	*Second-feet.*	*Second-feet.*	*Sec.-feet.*
September 20	15.41	28.12	43.53	43.84
September 27	16.17	27.99	44.16	
October 10	15.59	27.77	43.36	41.31
October 25	8.21	27.66	35.87	
October 28	8.23	36.48	44.71	
November 17	9.36	39.71	49.07	47.58
November 29	12.20	33.89	46.09	
December 13	11.41	35.99	47.40	45.21
December 26	11.17	31.86	43.03	
Mean				44.49
1900.				
May 15	17.60	28.42	46.02	43.93
May 23	13.88	27.97	41.85	
June 12	17.32	27.64	44.96	44.96
July 2	13.83	26.20	40.03	39.41
July 12	14.00	24.79	38.79	
August 1	14.00	24.48	38.48	38.48
September 8		27.09		
September 11	17.32	26.22	43.54	43.98
September 28	15.10	29.33	44.43	
Mean				42.15

Discharge measurements of Los Angeles River, Los Angeles County, near bridge No. 2.

Date.	Hydrographer	Discharge.	Locality.
		Sec.-feet.	
June 15, 1889	Wm. Mulholland	36.7	River.
Do	do	11.1	Power ditch.
Do	do	11.2	Main supply ditch.
	Total flow at bridge 2.	59.0	
July 15, 1889	Wm. Mulholland	33.3	River.
Do	do	11.0	Power ditch.
Do	do	14.1	Main supply ditch.
	Total at bridge 2	58.4	
Nov. 18, 1891	Wm. Mulholland	68.0	River.
Do	do	10.0	Power ditch.
Do	do	3.0	Main supply ditch.
	Total at bridge 2	81.0	
Nov. —, 1893	Wm. Mulholland	58.8	River.
Do	do	15.0	Power ditch.
Do	do	(?)	Main supply ditch.
Feb. 28, 1898	do	51.8	River.
Do	do	.7	Glassell tributary.
Do	do	15.0	Main supply ditch.
Do	do	.....	Power ditch, measurement above.
	Total at bridge 2	67.5	

Discharge measurements of Los Angeles River at bridge No. 2.

Note.—Total discharge of river at bridge No. 2 equals discharge at No. 2 + discharge at No. 7B, or No. 2 + No. 7—2.49.

Date.	Discharge at No. 7—2.49, or No. 7B.	Discharge at No. 17.	Discharge at bridge.	Total discharge at bridge.	Average for month.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*
August 19	15.59	0.06	41.29	56.94	57.79
August 25	16.17	.06	42.41	58.64	
September 20	15.41	.06	40.23	55.70	56.00
September 27	16.17	.06	40.07	56.30	
October 10	15.59	.05	39.35	54.99	55.61
October 25	8.21	.05	48.88	57.14	
October 28	8.23	.05	44.45	52.73	
October 31	8.78	.05	48.73	57.56	
November 17	9.36	.06	49.71	59.13	57.39
November 29	12.20	.06	43.40	55.66	
December 13	11.41	.07	46.69	58.17	58.15
December 26	11.17	.07	46.89	58.13	
Mean					56.99
1900.					
May 16	17.60	.14	39.61	57.35	54.91
May 23	13.88	.14	38.46	52.48	
June 12	17.32	.14	39.23	56.69	56.69
July 2	13.83	.10	35.38	49.31	52.43
July 13	15.32	.14	40.10	55.56	
August 1	14.00	.10	34.62	48.72	51.12
August 8	14.00	.10	34.77	48.87	
August 15	16.00	.10	38.58	54.68	
August 31	16.76	.10	35.36	52.22	
September 8			34.27		
September 11	17.32	.20	35.56	53.08	51.27
September 28	15.10	.08	34.28	49.46	
November 10	14.84	.10	39.45	54.39	54.39
Mean					53.46

Average discharge of Los Angeles River at weir No. 9.

Month.	1899.	1900.	Month.	1899.	1900.
	Sec.-feet.	*Sec.-feet.*		*Sec.-feet.*	*Sec.-feet.*
January	1.17	0.52	July	0.55	0.15
February	1.00	.49	August	.48	.18
March	1.16	.39	September	.44	.20
April	1.10	.38	October	.64	
May	.71	.30	November	.56	
June	.69	.24	December	.52	

Average discharge of developed water at weir No. 10.

Month.	1899.	1900.	Month.	1899.	1900.
	Sec.-feet.	*Sec.-feet.*		*Sec.-feet.*	*Sec.-feet.*
January		0.89	July	0.79	0.74
February		.81	August	.79	.73
March	0.96	.86	September	.83	.70
April	.93	.79	October	.86	
May	.90	.82	November	.94	
June	.86	.79	December	.91	

Average discharge of small tributary of Los Angeles River at weir M.

Month.	Discharge.	Month.	Discharge.
1899.	*Sec.-feet.*	1899.	*Sec.-feet.*
January	0.29	July	Dry.
February	.20	August	Do.
March	.20	September	Do.
April	.14	October	Do.
May	.07	November	Do.
June	.06	December	Do.

Average discharge of cut of West Los Angeles Water Company in San Fernando Valley, from gravel beds of Los Angeles River.

Month.	1899.	1900.	Month.	1899.	1900.
	Sec.-feet.	*Sec.-feet.*		*Sec.-feet.*	*Sec.-feet.*
May		5.79	September	6.02	
June		5.85	October	5.94	
July		5.75	November	6.07	
August	6.01	5.87	December	6.08	

Average discharge of Los Angeles River.

Measuring point.	Intervening distance along river.	Average discharge, August to December, inclusive, 1899.	Rate of growth per 100 feet, 1899.	Average discharge May to November, inclusive, 1900.	Rate of growth per 100 feet, 1900.
	Feet.	*Sec.-feet.*		*Sec.-feet.*	
Weir A		0.649		0.402	
	10,280		0.001		0.001
Weir B		.723		.276	
	3,486		.066		.064
Weir C		3.03		2.52	
	7,069		.039		.033
Weir E		5.89		4.84	
	4,585		.053		.048
Weir G		8.33		7.03	
	1,041		.105		.105
Weir L		9.42		8.12	
	770		.424		.310
Weir H		12.68		10.51	
	2,543		.210		.183
Weir I		17.97		15.17	
	3,926		.038		.089
Weir J		19.45		18.69	
	3,600		.100		.060
Weir K		23.06		20.85	
	6,345		.268		.217
Bridge P		40.09		34.60	
	4,629		.095		.163
Bridge Q		44.49		42.15	
	6,756		.185		.167
Bridge No. 2		56.99		53.46	

Discharge measurements of Los Angeles River, Los Angeles County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Aug. 21, 1899	S. G. Bennett	0.0	Pacoima, mouth of canyon.
Jan. 9, 1901	L. Mesmer	50.0	Do.
Sept. 20, 1901	S. G. Bennett	0.0	Do.
Aug. 21, 1899	do	.44	Tujunga, Headworks Monte Vista Canal.
Oct. 9, 1900	W. W. Cockins	.19	Do.
Sept. 21, 1901	S. G. Bennett	.22	Do.
Nov. 22, 1900	do	18.7	Tujunga Railroad, main line.
Do	do	.05	Tujunga, 3 miles below above measurement.
Do	do	10.60	Tujunga Railroad, main line, flood marks.
Aug. 21, 1899	do	0.0	Tujunga—little.

Discharge measurements of Los Angeles River at pumping stations in San Fernando Valley.

Year.	Hydrographer.	Discharge.	Remarks.
		Sec.-ft.	
1897	J. B. Lippincott	[a]0.11	Total output, 4 plants.
1898	do	[a].33	Total output, 7 plants.
1899	do	[a].99	Total output, 21 plants.
1900	do	[a]1.77	Total output, 33 plants.

[a] Reduced to continuous flow for summer months.

LOS FLORES CANYON.

Los Flores Canyon is situated on the southern slope of the Sierra Madre, in Los Angeles County. The area of the drainage basin above the line of township 1 north, above which all diversions occur, is 0.35 square mile. The canyon is in granite, largely shattered, with prevailing lines of cleavage extending northwest to southeast, but with other distinct lines bearing northeastward. Below the mouth of the canyon are the beautiful Pasadena Mesa lands. The scarcity of water, coupled with the general desirability of these lands, has caused much "development work" to be done for the purpose of increasing the water supply. Twelve tunnels in all have been run into this granite rock. The experience has been that as the fissures and cracks of the rock are opened a considerable discharge has resulted for a period of a few weeks, after which the flow decreased, and the tunnels would then again be extended or new ones run.

Following is a list of the tunnels, showing their lengths:

	Feet.
Los Flores tunnel:	
No. 1	23
No. 2	52
No. 3	96
No. 4	55
Mining tunnel	37
Twaddell tunnel	130
McNally tunnel	430
Los Flores tunnel:	
No. 5	185
No. 6	475
No. 7	200
No. 8	357
Twaddell's Tiptop tunnel	132
Total length	2,172

From the nature of the drainage basin and the data obtained from neighboring streams a reasonable natural run-off from this drainage basin, including flood waters, of from 0.10 to 0.15 second-foot might be expected in average years.

The granite bed rock in the drainage basin is covered with a few feet of coarse, disintegrated, granitic soil, very absorbent of water. Rain falling upon this is rapidly absorbed, and the tunnels show within a few weeks the effect of rainfall. During the years when measurements of the tunnels were made the rainfall was, as a rule, much below normal. In the following discharge measurements all the water which is diverted, both developed and natural flow, is included, but probably a few winter storms occurred that produced greater run-off than the capacity of the diversion pipes, and consequently some of the water must have escaped unmeasured.

The lesson to be drawn from this particular case is that the expenditure of the large amount of money required to construct these tunnels was ill advised, the water supply having been not materially, if at all, increased beyond the normal flow of the canyon prior to the construction of the tunnels. A similar experience is the result of like work in Eaton Canyon, which adjoins the Los Flores to the east.

Discharge measurements of Los Flores Canyon, Los Angeles County.

Date.	Mean discharge.	Remarks.
	Sec.-feet.	
1895	0.18	22 inches of rain.
1896	.10	10 inches of rain.
1897	.12	21 inches of rain.
1898	.08	9 inches of rain.
1899	.10	7 inches of rain.
1900	.09	11 inches of rain.
1901	.09	12 inches of raid.

LYTLE CREEK.

This small stream drains the southern slope of the Sierra Madre and discharges its waters on the plains northwest of San Bernardino. Although it drains a comparatively small area of 52 square miles, at the mouth of the canyon its waters are important for irrigation purposes. Owing to the controversies which have arisen over its diversions, a number of lawsuits for the settlement of the claims have been instituted from time to time. A number of measurements of this stream at the mouth of the canyon from 1892 to 1896, inclusive, are given below. They are copied from court records of proceedings in which the water supply of this creek was involved. These cases were tried in the San Bernardino courts by Judge J. W. McKinley. The measurements were made by A. H. Koebig and G. O. Newman, on weirs, and are believed to be accurate.

Discharge measurements of Lytle Creek at mouth of canyon, San Bernardino County, Cal.

Date.	Discharge.	Date.	Discharge.
1892.	*Second-feet.*	1894.	*Second-feet.*
June 3	35.58	August 19	11.44
September 20	18.70	August 25	12.32
September 30	22.04	October 3	16.20
October 28	20.64	1895.	
November 21	22.04		
November 27	20.68	September 2	56.10
1893.		September 30	40.78
		1896.	
September 7	49.20	March 3	18.08
September 18	49.20	April 23	19.14
September 25	46.34	April 24	18.60
October 4	45.30	April 25	20.52
1894.		May 3	18.52
June 6	17.96	May 4	17.26
June 8	15.50	May 10	18.16
July 10	13.22	May 25	15.32
July 11	13.22	May 26	12.84
July 25	13.36		

Beginning in 1894, measurements of Lytle Creek were also made by H. D. Sibley, who was zanjero of the Lytle Creek canals at that time. The measurements were usually made because the discharge of the stream was below normal. In the winter and spring only the amount of water needed for irrigation was turned into the ditches, but later in the summer the entire flow was diverted. These measurements also were made over weirs and are believed to be fairly accurate. During 1898 trouble was experienced through miners' taking the water from the natural channel and turning it into dry channels, sluice boxes, weirs, mill races, etc., thereby causing an alleged loss of from 20 to 25 per cent of the total flow of the creek. Only a portion of these latter diversions were returned to the creek. The measurements of Mr. Sibley would not show the full flow of Lytle Creek at all times, and sometimes show less than the full discharge, for the reasons mentioned above. During 1899 the amount of water which was diverted into the main canal was measured daily by the Anglo-American Canaigre Company, at a weir erected near the head of its cement ditch. The volumes given have been occasionally checked by visiting the canal and making meter measurements. It is believed that during 1899 practically all the water of the stream was diverted into the canal.

Discharge, in second-feet, of Lytle Creek main canal above Rialto, San Bernardino County, Cal.

[Drainage area, 52 square miles.]

1894.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1			15.5					
2								
3		24.1	17.2		10.9		13.5	
4								
5	16.1			10.8				
6		22.6						
7			14.1				11.4	14.5
8	19.9				10.8	13.0		
9								13.7
10								
11	17.8	18.5	14.3	10.8			13.7	
12								
13	21.8			13.4				
14			14.3			13.2		
15								
16	22.6		14.4					
17		19.1						
18			15.0		13.7	11.5	14.5	
19	22.6			14.1				
20								
21			14.8	12.7				
22	24.9				11.9	12.7		12.9
23			14.6					
24		18.2	14.9					
25	25.4						14.2	
26								
27			15.0					
28		16.6						
29								
30								12.5
31				11.7	13.4			

Discharge, in second-feet, of Lytle Creek main canal, etc.—Continued.

1895.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1			54.4						
2									
3							36.9		
4			68.0			51.4			
5									
6									
7								30.5	
8		33.9					31.5		
9									
10						48.8			
11								24.9	
12						50.8			
13									22.0
14									
15									
16					50.4				
17						44.8			
18	26.4	43.8					41.9		
19									
20									
21		57.5					36.5		
22							34.1	24.0	
23	37.4				52.5				
24						47.1			
25									
26					54.4				
27									
28						36.5	34.5		
29									
30									
31							34.5		

June 5 to August 16, ditch broken; no measurements.

Discharge, in second-feet, of Lytle Creek main canal, etc.—Continued.

1896.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1					17.8				13.2			
2				22.2		14.1	11.1					
3												
4												
5	20.0									12.2		
6						11.4			12.2			
7								11.5				
8		19.2					11.1					
9						13.5				11.6		16.0
10						12.5			12.2			
11												
12						11.9		10.5				
13		18.4										
14						12.2	12.2					16.0
15				24.9								
16	21.4				17.1			13.7	10.8			17.0
17			19.8									
18				19.7				11.3				
19									11.8			
20							10.5					
21								12.0				
22												16.0
23								12.5		11.1		
24				22.4				12.5				
25											28.0	
26									11.8	20.0		
27							10.7					
28								13.5				
29		17.5										
30					15.0							24.0
31												

Heavy rains March 1 to 15 and October 26; all water turned out of canal.

Discharge, in second-feet, of Lytle Creek main canal, etc.—Continued.

1897.

Day.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.
1								
2								
3		60.0						
4					36.0			
5								
6			60.0					
7		24.0						
8								
9				50.0	30.0			
10	16.0							
11								
12								10.6
13								
14			60.0					
15								
16	24.0				34.0			
17								
18		80.0						
19				60.0				
20								
21		50.0						
22								
23								
24				50.0				
25	20.0		60.0					
26								
27								
28		56.0	70.0	40.0				
29	28.0							
30								
31								

Heavy rains February 3 and 18, March 28, September 14. Chicala Water Company took charge of station June 1.

Discharge, in second-feet, of Lytle Creek main canal, etc.—Continued.

1898.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1			10.9	12				23			
2				13				24			
3				14				25			
4				15		13.9		26			
5				16				27			
6				17				28	14.6	9.0	
7				18				29			
8				19				30			
9				20		11.5		31			
10				21							
11				22		11.7					

No measurements for January to April, inclusive, and August to December, inclusive.

Discharge, in second-feet, of Lytle Creek main canal, etc.—Continued.

1899.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	11.1	11.8	11.2	9.7	11.2	12.2	6.3	9.4	14.5	10.9	10.5	11.1
2	11.1	12.1	11.1	8.9	10.9	10.4	6.8	10.4	15.1	10.8	10.3	11.3
3	12.1	12.1	11.2	8.5	10.9	9.7	6.4	9.6	16.6	10.8	10.3	11.4
4	11.4	12.4	11.1	12.6	10.5	9.5	6.4	10.7	16.7	10.8	10.6	11.1
5	11.7	12.4	10.8	12.5	10.5	9.4	6.4	12.2	16.0	10.7	10.5	11.3
6	11.6	12.5	10.6	12.1	10.5	9.6	6.4	11.0	16.0	10.6	10.6	11.3
7	11.6	12.6	10.4	11.9	10.5	9.2	6.3	10.8	16.0	10.1	10.6	11.3
8	11.6	12.4	10.4	11.8	10.2	9.0	6.2	11.0	15.9	9.9	9.9	11.6
9	11.6	12.1	10.9	11.7	11.8	------	6.2	11.0	16.5	10.2	9.9	11.4
10	12.0	11.8	10.6	11.9	9.5	7.2	6.0	8.7	16.1	10.8	10.0	11.5
11	16.1	11.8	10.6	11.7	9.5	7.5	5.9	12.0	16.0	11.7	10.2	11.4
12	13.1	11.8	10.6	11.7	9.2	8.2	6.0	12.0	15.8	[a]72.1	10.5	11.3
13	12.2	11.8	10.7	11.0	9.6	8.1	5.9	12.2	15.3	12.4	10.9	11.2
14	12.0	11.6	10.7	10.6	9.5	7.8	5.9	12.1	15.4	13.5	11.0	11.1
15	11.9	11.5	10.7	10.6	9.8	------	6.0	12.3	16.0	12.7	11.3	11.2
16	12.0	11.5	15.3	10.7	9.4	7.6	6.0	12.3	15.5	13.0	11.7	12.9
17	12.0	11.5	14.7	10.6	9.4	7.8	5.8	12.2	15.3	13.0	11.5	11.8
18	12.0	11.3	13.7	10.7	9.4	7.9	5.4	12.6	14.3	12.3	12.0	11.8
19	11.9	11.4	12.3	10.2	9.7	7.7	5.6	13.0	15.7	12.0	11.9	11.6
20	11.8	11.3	13.7	10.8	9.8	7.3	5.6	13.0	14.9	11.4	11.8	11.6
21	11.7	11.3	13.1	9.9	9.5	7.5	5.8	12.5	15.2	11.2	12.2	11.3
22	11.8	11.3	12.9	9.9	9.4	7.6	7.2	12.4	16.1	11.6	12.7	11.1
23	11.7	11.3	12.8	10.3	9.4	7.4	8.6	12.4	10.8	11.9	12.1	11.1
24	11.6	11.8	13.2	10.6	9.2	7.1	9.3	12.5	10.4	10.3	12.0	11.1
25	11.6	11.4	14.8	10.5	9.2	7.2	8.9	12.4	10.3	10.7	13.8	10.9
26	11.6	11.4	13.5	10.4	9.0	7.4	9.2	12.6	10.3	11.4	11.7	11.2
27	11.6	11.3	13.4	10.4	9.0	7.3	9.4	12.5	10.5	11.3	11.5	11.1
28	11.6	11.3	13.6	10.4	9.0	7.2	9.5	12.2	10.5	11.1	11.5	11.1
29	11.6	------	13.6	11.0	9.4	6.7	9.7	12.3	10.6	11.0	11.4	11.2
30	11.6	------	13.5	11.2	9.3	6.4	9.6	12.2	10.6	11.4	11.2	11.1
31	11.7	------	13.5	------	-----	------	10.0	12.1	------	11.3	-----	11.3
Mean	11.9	11.7	12.2	10.8	9.8	8.1	7.1	11.8	14.3	13.3	11 2	11.3

[a] Rain in mountains.

The summer of 1898 was one during which the smallest stream flow occurred in southern California of which we have record. The period of smallest summer flow was during the month of September. During this minimum period the Edison Electric Company had certain measurements made on Lytle Creek at half hour intervals, to determine the diurnal fluctuations. The discharge of the stream was as follows:

Discharge measurements of Lytle Creek at Millers Narrows, San Bernardino County.

Date.	Time.	Discharge.	Date.	Time.	Discharge.
		Sec.-feet.			*Sec.-feet.*
Sept. 15, 1898	7 a. m.	9.16	Sept. 15, 1898	10.30 p. m.	8.88
Do.	7.30 a. m.	9.16	Do.	11 p. m.	8.88
Do.	8 a. m.	9.16	Do.	11.30 p. m.	8.88
Do.	8.30 a. m.	9.16	Do.	12 midnight.	9
Do.	9 a. m.	9.00	Sept. 16, 1898	12.30 a. m.	9
Do.	9.30 a. m.	7.94	Do.	1 a. m.	9
Do.	10 a. m.	8.02	Do.	1.30 a. m.	9.16
Do.	10.30 a. m.	8.02	Do.	2 a. m.	9.16
Do.	11 a. m.	8.02	Do.	2.30 a. m.	9.16
Do.	11.30 a. m.	7.74	Do.	3 a. m.	9.16
Do.	12 m.	7.46	Do.	3.30 a. m.	9.16
Do.	12.30 p. m.	7.34	Do.	4 a. m.	9.16
Do.	1 p. m.	7.20	Do.	4.30 a. m.	9.16
Do.	1.30 p. m.	7.20	Do.	5 a. m.	9.16
Do.	2 p. m.	7.20	Do.	5.30 a. m.	9.16
Do.	2.30 p. m.	7.20	Do.	6 a. m.	9.16
Do.	3 p. m.	7.06	Do.	6.30 a. m.	9.16
Do.	3.30 p. m.	7.06		12-hour mean	8.86
Do.	4 p. m.	6.94			
Do.	4.30 p. m.	7.06	Sept. 16, 1898	7 a. m.	9.28
Do.	5 p. m.	7.06	Do.	7.30 a. m.	9.28
Do.	5.30 p. m.	7.34	Do.	8 a. m.	9.16
Do.	6 p. m.	7.46	Do.	8.30 a. m.	9
Do.	6.30 p. m.	7.46	Do.	9 a. m.	9
	12-hour mean	7.77	Do.	9.30 a. m.	8.02
			Do.	10 a. m.	8.02
Sept. 15, 1898	7 p. m.	7.46	Do.	10.30 a. m.	7.74
Do.	7.30 p. m.	7.74	Do.	11 a. m.	7.74
Do.	8 p. m.	8.40	Do.	11.30 a. m.	7.46
Do.	8.30 p. m.	8.58	Do.	12 m.	7.20
Do.	9 p. m.	8.52	Do.	12.30 p. m.	7.20
Do.	9.30 p. m.	8.72	Do.	1 p. m.	7.06
Do.	10 p. m.	8.88	Do.	1.30 p. m.	6.94

Discharge measurements of Lytle Creek at Millers Narrows, etc.—Continued.

Date.	Time.	Discharge.	Date.	Time.	Discharge.
		Sec.-feet.			*Sec.-feet.*
Sept. 16, 1898	2 p. m.	6.80	Sept. 16, 1898	10.30 p. m.	9
Do	2.30 p. m.	6.94	Do	11 p. m.	9
Do	3 p. m.	7.20	Do	11.30 p. m.	9
Do	3.30 p. m.	7.20	Do	12 midnight	9
Do	4 p. m.	7.34	Sept. 17, 1898	12.30 a. m.	9.16
Do	4.30 p. m.	7.34	Do	1 a. m.	9.16
Do	5 p. m.	7.46	Do	1.30 a. m.	9.16
Do	5.30 p. m.	7.46	Do	2 a. m.	9.16
Do	6 p. m.	7.60	Do	2.30 a. m.	9.16
Do	6.30 p. m.	7.60	Do	3 a. m.	9.16
	12-hour mean	7.75	Do	3.30 a. m.	9.16
			Do	4 a. m.	9.16
Sept. 16, 1898	7 p. m.	8.02	Do	4.30 a. m.	9.06
Do	7.30 p. m.	8.88	Do	5 a. m.	9.28
Do	8 p. m.	8.88	Do	5.30 a. m.	9.28
Do	8.30 p. m.	8.88	Do	6 a. m.	9.28
Do	9 p. m.	8.88	Do	6.30 a. m.	9.28
Do	9.30 p. m.	8.88		12-hour mean	9.04
Do	10 p. m.	9			

The following measurements were made by the United States Geological Survey:

Discharge measurements of Lytle Creek at mouth of canyon, San Bernardino County.

Date.	Hydrographer.	Discharge.	Date.	Hydrographer.	Discharge.
		Sec.-feet.			*Sec.-feet.*
July 24, 1896	J. H. Quinton	15.7	June 8, 1900	S. G. Bennett	6.2
June 10, 1898	J. B. Lippincott	10.7	Sept. 29, 1900	W. W. Cockins, jr.	4.6
Aug. 27, 1898	F. H. Olmsted	10.0	Apr. 4, 1902	S. G. Bennett	19.9
Aug. 29, 1899	S. G. Bennett	12.5	Sept. 5, 1902	W. B. Clapp	5.0

MAMMOTH CREEK.

See Owens River, Mammoth Creek.

MARIA IGNACIA CREEK.

Discharge measurement of Maria Ignacia Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.
		Sec. feet.
Aug. —, 1899	Geo. F. Wright	0.23

MARIPOSA CREEK.

Estimated monthly discharge of Mariposa Creek at base of foothills, Mariposa County. [a]

[Drainage area, 122 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	0	0	0	0	0	0
December	0	0	0	0	0	0
1879.						
January	0	0	0		0	0
February			20	1,111	.16	.17
March			45	2,767	.37	.43
April			43	2,559	.35	.39
May			4	246	.03	.03
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December			15	922	.12	.14
The year			11	7,605	.09	1.16
1880.						
January			20	1,230	.16	.18
February			49	2,819	.40	.43
March			24	1,476	.20	.23
April			24	1,428	.20	.22
May			18	1,107	.15	.17
June			12	714	.10	.11
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December			92	5,657	.75	.86
The year			20	14,431	.16	2.20

[a] Authority, California State engineering department. Estimated from run-off of neighboring streams.

Estimated monthly discharge of Mariposa Creek, etc—Continued.

Month.	Discharge.			Total dis. charge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			134	8,239	1.10	1.27
February			171	9,497	1.40	1.46
March			38	2,337	.31	.36
April			5	298	.04	.04
May			0	0	0	0
June			0	0	0	0
July			0	0	0	0
August			0	0	0	0
September			0	0	0	0
October			0	0	0	0
November			0	0	0	0
December			0	0	0	0
The year			29	20,371	24	3.13
1882.						
January	0	0	0	0	0	0
February			24	1,333	.20	.21
March			74	4,550	.61	.70
April			98	5,831	.80	.89
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November		0	18	1,071	.15	.17
December			12	738	.10	.12
The year			19	13,523	.15	2.09

Estimated monthly discharge of Mariposa Creek, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off,	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1883.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			49	3,013	0.40	0.46
February			24	1,333	.20	.21
March			122	7,501	1.00	1.15
April			73	4,344	.60	.67
May		0	37	2,275	.30	.35
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	0	0	0	0	0	0
The year			25	18,466	.21	2.84
1884.						
January		0	12	738	.10	.12
February			488	28,070	4.00	4.31
March			671	41,258	5.50	6.34
April			488	29,037	4.00	4.46
May			244	15,003	2.00	2.31
June			122	7,259	1.00	1.12
July		0	49	3,013	.40	.46
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0

MAYBERRY CANYON.

Discharge measurements of Mayberry Canyon, Los Angeles County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Oct. 19, 1898	J. B. Lippincott	1.40	Alhambra water—including pumped water.
	do	.24	Mayberry water—including pumped water.
	Total flow of canyon	1.64	
Sept. 23, 1899	J. B. Lippincott	1.38	Alhambra water—including pumped water.

McCLOUD RIVER.

Discharge measurements of McCloud River, Shasta County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
Sept. 9, 1901	S. G. Bennett	1,096	One-fourth mile above United States fishery.
Sept. 23, 1902	do	1,272	At Hirze Mountain.
Sept. 24, 1902	Chas. A. Miller	1,325	1 mile above Squaw Creek.
Sept. 26, 1902	do	1,356	United States fishery.
Sept. 24, 1902	do	67	Squaw Creek at bridge above mouth.

McINTYRE DITCH.

See San Bernardino Valley, McIntyre ditch.

McKENZIE DITCH.

See San Bernardino Valley, McKenzie ditch.

MEEKS & DALEY DITCH.

See San Bernardino Valley, Meeks & Daley ditch.

MERCED RIVER.

Merced River above Merced Falls drains approximately 1,090 square miles of the western slopes of the Sierra Nevada. Included in the eastern portion of its drainage area are a large number of high peaks, the highest, Mount Lyell, reaching an elevation of 13,090 feet.

The midsummer flow of this stream is larger in proportion to its drainage area than that of the Tuolumne River, which adjoins it on the north.

In their plunge into the Yosemite Valley the waters of the Merced River and its tributaries form most beautiful waterfalls.

The measurement and record of this stream was undertaken in response to numerous requests from persons interested in mining and irrigation. The midsummer flow of the stream is less than the combined capacity of the irrigation and power canals taking water in the vicinity of Snelling. The owners of these canals offered to pay $100 toward the expenses of equipping and maintaining the gaging station for the first year. Mr. H. H. Henderson, county surveyor of Merced County, established a gaging station at a point 1 mile above Merced Falls, April 6, 1901. Meter measurements are made from a cable. The observer is Mr. Charles Siegfeldt.

Discharge measurements of Merced River, Merced County.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
		Feet.	*Sec.-feet.*	
Sept. 11, 1899	S. G. Bennett		35	River, 1 mile above headworks Crocker-Hoffman Canal.[a]
Do	do		5	Old Mill Valley ditch.
Do	do		16.5	Crocker-Hoffman Canal, 300 feet below headworks.
Sept. 10, 1900	do		6.5	Do.
Sept. 4, 1902	L. M. Lawson		37	Crocker-Hoffman Canal, 3 miles below Snelling.
Nov. 27, 1895	J. B. Lippincott		125	Merced Falls.
Sept. 10, 1900	S. G. Bennett		63	Do.
Apr. 6, 1901	do	10.3	1,379	Do.
June 11, 1901	J. B. Lippincott	12	4,139	Do.
Aug. 2, 1901	S. G. Bennett	10.05	1,122	Do.
Aug. 31, 1901	do	8.6	220	Do.
Mar. 6, 1902	do	10.1	1,302	Do.
May 13, 1902	do	12.15	5,413	Do.
Sept. 3, 1902	L. M. Lawson		109	Do.
Sept. 10, 1900	S. G. Bennett		27	Merced River Mills Canal, 2 miles below Snelling.
Do	do		2.1	Snelling ditch.
Aug. 22, 1896	J. B. Lippincott		89	Yosemite Valley, Stoneman House.

[a] Several small ditches are taken out of Merced River above this point.

Discharge measurements of Merced River, Merced County—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
		Feet.	*Sec.-feet.*	
Sept. 25, 1894	N. C. Ray		135	Sec. 6, T. 4 S., R. 17 E., M. D. M.; floats.
Sept. 1–10, 1895	do		680	Sec. 36, T. 3 S., R. 16 E., M. D. M.; floats.
Mar. 25, 1899	do		4,000	Sec. 22, T. 3 S., R. 16 E., M. D. M.; floats.
Sept. 20, 1899	J. H. McKenzie		64	Sec. 6, T. 4 S., R. 17 E., M. D. M.; estimated.
Oct. 20, 1899	N. C. Ray		1,050	Sec. 22, T. 3 S., R. 16 E., M. D. M.; floats.
Sept. 3, 1900	do		55	Flume at Nameless Mining Co.'s dam; all water turned in.
Nov. 22, 1900	do		20,228	Over crest of Nameless Mining Co.'s dam.
Oct. —, 1901	A. Britt		67	Over weir during construction of Mas. C. and M. Co.'s dam.
Sept. 3, 1902	E. T. Perkins		33	150 yards above junction of Illilonette.
Do	do		2.7	Tenaya River, 50 yards above bridge.
Do	do		6.2	Illilonette River, 100 yards above junction of Merced.
Sept. 4, 1902	do		2	Bridal Veil Creek, below bridge in Yosemite Valley.
Do	do		3.2	South Fork at Wawona, below all buildings.
Aug. 30, 1902	L. M. Lawson		76	Benton Mills power flume at Benton Mills.
Aug. 31, 1902	do		97	Horseshoe Bend.
Sept. 1, 1902	do		15	Ditch below power house at Merced Falls.
Do	do		78	1,000 feet below Merced Falls.

Estimated monthly discharge of Merced River at Merced Falls, Merced County.[a]

[Drainage area, 1,076 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1879.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			354	21,767	0.33	0.38
February			1,506	83,639	1.40	1.46
March			2,098	129,001	1.95	2.25
April			3,120	185,653	2.90	3.24
May			3,336	205,123	3.10	3.57
June			3,336	198,506	3.10	3.46
July			968	59,520	.90	1.04
August			172	10,576	.16	.18
September			75	4,463	.07	.08
October			75	4,612	.07	.08
November			172	10,235	.16	.18
December			646	39,721	.60	.69
The year			1,321	952,816	1.23	16.61
1880.						
January			387	23,796	.36	.42
February			753	43,313	.70	.75
March			807	49,621	.75	.86
April			4,250	252,893	3.95	4.41
May			4,842	297,723	4.50	5.19
June			5,111	304,126	4.75	5.30
July			2,744	168,722	2.55	2.94
August			753	46,300	.70	.81
September			323	19,220	.30	.33
October			269	16,540	.25	.29
November			237	14,102	.22	.25
December			1,291	79,380	1.20	1.38
The year			1,814	1,315,736	1.69	22.93

[a] Authority, state engineer, from 1879 to 1884, inclusive. Figures for January, February, and March, 1879, May, June, and July, 1881, November and December, 1882, and the years 1883 and 1884, are estimated from the run-off of neighboring streams. Those from April, 1879, to April, 1881, and from August, 1881, to October, 1882, inclusive, are estimated in part from rod records.

Estimated monthly discharge of Merced River at Merced Falls, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			2,044	125,681	1.90	2.19
February			3,443	191,214	3.20	3.33
March			1,560	95,921	1.45	1.67
April			2,798	166,493	2.60	2.90
May			4,412	271,283	4.10	4.73
June			3,336	198,506	3.10	3.46
July			1,506	92,600	1.40	1.61
August			377	23,181	.35	.40
September			129	7,676	.12	.13
October			75	4,612	.07	.08
November			75	4,463	.07	.08
December			323	19,860	.30	.35
The year			1,673	1,201,489	1.55	20.93
1882.						
January			172	10,576	.16	.18
February			753	41,820	.70	.73
March			1,506	92,600	1.40	1.61
April			2,260	134,479	2.10	2.34
May			3,658	224,922	3.40	3.92
June			3,336	198,506	3.10	3.46
July			1,076	66,161	1.00	1.15
August			215	13,220	.20	.23
September			129	7,676	.12	.13
October			484	29,760	.45	.52
November			387	23,028	.36	.40
December			237	14,573	.22	.25
The year			1,184	857,319	1.10	14.92

Estimated monthly discharge of Merced River at Merced Falls, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1883.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			344	21,152	.32	.37
February			355	19,716	.33	.34
March			915	56,261	.85	.98
April			2,260	134,479	2.10	2.34
May			5,488	337,444	5.10	5.88
June			4,412	262,532	4.10	4.57
July			1,184	72,801	1.10	1.27
August			377	23,181	.35	.40
September			237	14,102	.22	.25
October			183	11,252	.17	.20
November			161	9,580	.15	.17
December			172	10,576	.16	.18
The year			1,341	973,076	1.25	16.95
1884.						
January			237	14,573	.22	.25
February			2,712	155,996	2.52	2.72
March			3,820	234,883	3.55	4.09
April			4,896	291,332	4.55	5.07
May			5,434	334,124	5.05	5.82
June			6,510	387,372	6.05	6.75
July			4,358	267,963	4.05	4.67
August			1,130	69,481	1.05	1.21
September			237	14,102	.22	.25
October			172	10,576	.16	.18

Estimated monthly discharge of Merced River, Merced County, 1 mile above Merced Falls.[a]

[Drainage area, 1,030 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
April	5,000	1,090	2,687	133,240	1.55	1.73
May	9,450	2,700	5,419	333,201	4.97	5.73
June	8,220	3,380	5,389	320,678	4.94	5.51
July	4,560	1,090	2,096	128,878	1.92	2.21
August	2,090	220	704	43,287	.65	.75
September	250	130	183	10,889	.17	.19
October	990	150	265	16,294	.24	.28
November	730	0	399	23,742	.37	.41
December	2,090	220	577	35,478	.53	.61
1902.						
January	410	195	236	14,511	.22	.25
February	4,020	170	749	41,597	.69	.72
March	5,720	460	1,367	84,054	1.25	1.44
April	5,460	730	2,457	146,202	2.25	2.51
May	6,240	2,180	3,795	233,345	3.48	4.01
June	5,460	1,220	3,142	186,962	2.88	3.21
July	1,110	280	481	29,576	.44	.51
August	320	110	191	11,744	.18	.21
September	110	65	88	5,236	.08	.09
October	280	65	90	5,534	.08	.09
November	1,110	90	246	14,638	.23	.26
December	1,340	195	303	18,631	.28	.32
The year	6,240	65	1,095	792,030	1.01	13.62

[a] U. S. Geol. Survey.

MILL CREEK.

See King River, Mill Creek.

MILL CREEK.

This stream is one of the larger tributaries of Santa Ana River, although on account of its importance for irrigation it is generally considered as an independent stream. It rises on the western slope of the San Bernardino Mountains, draining the area immediately south of the headwaters of Santa Ana River. Mill Creek appears from its canyon about 5 miles east of Redlands. The Crafton Water

Company diverts all the water of this creek at the mouth of the canyon, particularly in the summer. The water passes over a weir, and the volume is therefore determined with considerable accuracy.

Discharge measurements of Mill Creek at headworks Crafton Canal, San Bernardino County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Nov. 9, 1898	F. H. Olmsted	15.2
Dec. 8, 1898	do	12.6
July 15, 1899	S. G. Bennett	7.4
July 23, 1898	J. B. Lippincott	11.8
Jan. 12, 1899	S. G. Bennett	10.8
Apr. 29, 1898	J. B. Lippincott	18.9
Oct. 2, 1900	W. W. Cockins, jr	[a] 8.6
Apr. 12, 1898	J. B. Lippincott	15.7
June 12, 1898	do	18.1
Sept. 8, 1898	do	13.1
Oct. 18, 1898	F. H. Olmsted	15.3
Mar. 23, 1899	S. G. Bennett	15.6
May 6, 1899	do	14.6
May 31, 1899	do	11.6
June 15, 1899	do	6.8
July 27, 1899	do	4.3
Aug. 24, 1899	do	[b] 5.7
Do	do	[c] 1.5
Apr. 14, 1900	do	10.8
July 13, 1900	do	[b] 5.4
Do	do	[c] 3.4
Mar. 30, 1901	do	20.0
May 5, 1900	do	[b] 39.0
Do	do	[d] 8.0
July 6, 1901	do	23.3
Feb. 18, 1899	do	10.4
July 29, 1896	J. H. Quinton	14.2
Dec. 5, 1901	S. G. Bennett	14.5
Apr. 5, 1902	do	15.7
Do	do	[b] 5.4
May 31, 1902	do	19.2
July 10, 1902	do	10.8
Sept. 3, 1902	W. B. Clapp	5.3
Nov. 5, 1902	S. G. Bennett	12.3

[a] Of which 1.35 is pumped. [b] In creek. [c] Pumped. [d] Canal.

Discharge measurements of Mill Creek at Mountain Home, San Bernardino County.

[Measurements made by Edison Electric Company.]

Date.	Discharge.
Sept. 15, 1898:	*Sec.-feet.*
7 a. m	11.74
7.30 a. m	11.74
8 a. m	11.58
8.30 a. m	11.74
9 a. m	11.74
9.30 a. m	11.42
10 a. m	11.26
10.30 a. m	11.26
11 a. m	11.08
11.30 a. m	10.78
12 m	10.48
12.30 p. m	10.32
1 p. m	10
1.30 p. m	9.84
2 p. m	9.54
2.30 p. m	9.40
3 p. m	9.24
3.30 p. m	9.24
4 p. m	9.24
4.30 p. m	9.24
5 p. m	9.24
5.30 p. m	9.24
6 p. m	9.54
6.30 p. m	9.54
12-hour mean	10.35
Sept. 15, 1898:	
7 p. m	9.54
7.30 p. m	9.42
8 p. m	9.84
8.30 p. m	9.84
9 p. m	10
9.30 p. m	10.16
10 p. m	10.36
10.30 p. m	10.48
11 p. m	10.48
11.30 p. m	10.78
12 midnight	10.62
Sept. 16, 1898:	*Sec.-feet.*
12.30 a. m	10.78
1 a. m	11.08
1.30 a. m	11.08
2 a. m	11.08
2.30 a. m	11.26
3 a. m	11.26
3.30 a. m	11.26
4 a. m	11.26
4.30 a. m	11.26
5 a. m	11.42
5.30 a. m	11.26
6 a. m	11.42
6.30 a. m	11.42
12-hour mean	10.72
Sept. 16, 1898:	
7 a. m	11.26
7.30 a. m	11.26
8 a. m	10.94
8.30 a. m	11.08
9 a. m	11.08
9.30 a. m	10.78
10 a. m	10.48
10.30 a. m	10.48
11 a. m	10.32
11.30 a. m	10.16
12 m	10.00
12.30 p. m	9.84
1 p. m	9.68
1.30 p. m	9.54
2 p. m	9.40
2.30 p. m	9.24
3 p. m	9.10
3.30 p. m	9.24
4 p. m	8.94
4.30 p. m	8.94
5 p. m	8.94
5.30 p. m	8.94

Discharge measurements of Mill Creek at Mountain Home, etc.—Continued.

Date.	Discharge.	Date.	Discharge.
Sept. 16, 1898:	*Sec.-feet.*	Sept. 17, 1898:	*Sec.-feet.*
6 p. m	9.08	12.30 a. m	10.48
6.30 p. m	9.40	1 a. m	10.48
12-hour mean	9.92	1.30 a. m	10.64
Sept. 16, 1898:		2 a. m	10.78
7 p. m	9.54	2.30 a. m	10.78
7.30 p. m	9.68	3 a. m	10.78
8 p. m	9.68	3.30 a. m	10.78
8.30 p. m	9.84	4 a. m	10.78
9 p. m	9.84	4.30 a. m	11.08
9.30 p. m	9.84	5 a. m	11.08
10 p. m	10.16	5.30 a. m	11.08
10.30 p. m	10.16	6 a. m	11.26
11 p. m	10.32	6.30 a. m	11.26
11.30 p. m	10.32	12-hour mean	10.46
12 midnight	10.32		

Discharge measurements of Mill Creek, San Bernardino County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
July 15, 1899	S. G. Bennett	8.9	Redlands Power Co., lower intake.[a]
Oct. 2, 1900	W. W. Cockins, jr	7.3	Do.

[a] Loss from this intake to head of Crafton Canal, 1.46 second-feet.

Estimated monthly discharge of Mill Creek at Crafton Canal headworks.

[Drainage area, 47 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
August	27.6	24.0	24.5	1,505	0.52	0.60
September	26.5	19.5	22.0	1,310	.47	.52
October	24.5	17.0	19.6	1,205	.42	.48
1896.						
May	21.4	9.4	13.4	825	.28	.33
June	16.0	5.1	10.3	615	.22	.25
July	16.0	6.1	11.5	709	.24	.28
August	13.2	8.7	11.6	716	.25	.28
September	15.0	7.4	11.5	687	.24	.27
October	13.1	9.0	10.5	637	.22	.26
1899.						
February	13.0	11.0	11.6	644	.25	.26
March	16.0	10.0	12.2	750	.26	.30
April	13.0	11.0	11.8	702	.25	.28
May	12.0	10.0	11.2	689	.23	.26
June	17.0	4.0	8.7	518	.19	.21
July	7.2	4.8	5.8	357	.12	.14
August	7.2	2.9	5.8	357	.12	.14
September	5.7	2.0	4.1	244	.09	.10
October	8.5	4.3	6.5	400	.14	.16
November	11.2	6.1	8.6	512	.18	.20
December	14.6	5.3	9.5	584	.20	.23
1900.[a]						
January	10.6	9.8	10.0	615	.22	.25
February	10.6	9.8	10.0	555	.22	.23
March	13.2	9.6	10.0	615	.22	.25
April	13.3	8.9	10.0	595	.22	.24
May	17.0	8.2	12.0	738	.27	.31
June	8.2	5.3	7.0	417	.16	.18
July	6.3	3.3	5.0	307	.11	.13
August	5.7	4.3	5.0	307	.11	.13
September	5.7	4.3	5.0	298	.11	.12
October	5.8	3.8	5.0	307	.11	.13
November 1 to 17	8.5	5.1	5.0	298	.11	.12

[a] Exclusive of pumped water.

Estimated monthly discharge of Mill Creek at Crafton Canal headworks—Cont'd.

Month.	Discharge.			Total.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
June 19 to 30	20.9	19.4	20.1	478	.43	.19
July	19.1	13.9	15.9	975	.34	.39
August (23 days)[a]	50.0	15.0	19.1	870	.41	.35
September	16.6	11.4	14.0	835	.30	.33
October	13.2	12.3	12.6	774	.27	.31
November	12.3	11.6	12.3	731	.26	.29
December	12.3	10.3	12.0	738	.26	.30

[a] On August 16 a cloudburst in Mill Creek Canyon and Crafton Hills filled zanje and supply canal with sand. No record from August 16 to 23, inclusive.

MILL CREEK, GREEN SPOT PIPE LINE.

See Santa Ana River, Green Spot pipe line.

MILL CREEK.

See Stanislaus River, Mill Creek.

MILL FLUME AND PUMP, RIVERSIDE WATER COMPANY.

See San Bernardino Valley.

MISSION CREEK.

Discharge measurements of Mission Creek, Santa Barbara County, 200 feet above dam.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Jan. 15, 1888	A. Poett	0.93
Jan. 24, 1888	do	2.80
Feb. 7, 1888	do	1.37
Mar. 16, 1888	do	2.23
July 26, 1888	do	.36
July 13, 1889	do	.43
Aug. —, 1889	G. F. Wright	.46
Sept. 1, 1889	A. Poett	.32
June 11, 1892	do	.36
June 17, 1900	R. Moyer	[a].05

[a] Above diversions, but not on bed rock.

MOHAVE RIVER.

The streams forming the headwaters of this river have their source on the northern slope of the Sierra Madre and flow northerly, the river finally disappearing in the sands of the Mohave Desert. At Victorville, a station on the Atchison, Topeka and Santa Fe Railroad, the river passes through a narrow gorge, locally known as The Narrows. This place has been under investigation as a possible dam site, and soundings for the depth of bed rock were made by the United States Geological Survey during the season of 1899. The greatest depth of bed rock was found to be 54 feet. The diamond drill showed the rock to be a fine-grained granite.[a] Above The Narrows the valley broadens into a large reservoir site, and at the 145-foot flow line is said to cover 7,718 acres. In order to determine the amount of water available for storage for this reservoir, a gaging station was established February 27, 1899. The rod is a 2 by 6 inch timber, bolted to a vertical cliff on the right bank of the river, 600 feet upstream from the wagon bridge. The bench mark is top of east rail of the Santa Fe track, 75 feet south of center of wagon bridge over track. The zero mark of rod is 12.84 feet below bench mark.

Discharge measurements of Mohave River at Victorville Narrows, San Bernardino County.

Date.	Hydrographer.	Gage height.	Discharge.
1899.		*Feet.*	*Sec.-feet.*
Feb. 27	B. Cole	1.0	44
May 5	S. G. Bennett	.9	33
June 13	do	.9	31
July 26	do	.85	27
Sept. 5	do	.85	28
1900.			
Apr. 13	do	.9	36
Apr. 28	P. H. Leahy	.9	42
May 11	do	.9	36
May 23	do	.9	34
May 29	do	.9	26
June 3	do	.9	24
June 20	do	.85	29
July 6	do	.85	31
July 25	do	.85	28

[a] Twenty-first Ann. Rept. U. S. Geol. Survey, pt. 4, 1901, p. 472.

Discharge measurements of Mohave River at Victorville Narrows, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Feb. 11	S. G. Bennett	1.4	664
Mar. 4	P. H. Leahy	1.3	512
Mar. 25	do	.9	50
Apr. 9	do	.9	39
Apr. 27	do	.9	48
May 10	do	.85	47
May 25	do	.85	51
June 10	do	.85	43
June 25	do	.9	42
July 12	do	.9	40
July 28	do	.9	42
Aug. 8	do	.9	45
Aug. 31	do	.9	55
Sept. 6	do	.9	49
Sept. 20	do	.9	61
Oct. 5	do	.9	57
Oct. 24	do	.9	82
Nov. 6	do	.9	78
Nov. 24	do	.9	76
Dec. 10	do	.9	76
Dec. 25	do	.9	69
1902.			
Jan. 4	do	.9	47
Jan. 21	do	.9	53
Feb. 1	do	.9	58
Feb. 25	do	.9	63
Mar. 5	do	.9	66
Mar. 29	do	.9	66
Apr. 5	do	.9	67
Apr. 19	do	.9	62
Apr. 26	do		47
May 10	do		37
May 25	do		49
June 8	do		53
June 27	do		47
July 5	do		38
July 26	do		41
Aug. 9	do		48
Aug. 15	do		33
Oct. 20	do		49
Oct. 30	do		45
Nov. 10	do		43
Nov. 27	do		50
Dec. 11	do		68
Dec. 19	do		69
Dec. 27	S. G. Bennett		55

Estimated monthly discharge of Mohave River at Victorville.

[Drainage area 400 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January						
February						
March	60	28	37	2,275	0.09	0.10
April	60	28	37	2,202	.09	.10
May	44	28	33	2,029	.08	.09
June	44	28	29	1,726	.07	.08
July	28	22	27	1,660	.07	.08
August	28	17	24	1,476	.06	.07
September	22	22	22	1,309	.05	.06
October	28	17	23	1,414	.06	.07
November	44	22	27	1,607	.07	.08
December 1 to 13	28	28	28	1,722	.07	.08
1900.						
January	44	44	44	2,705	.11	.13
February	60	44	49	2,721	.12	.12
March	80	44	57	3,505	.14	.16
April	44	33	35	2,083	.09	.10
May	33	33	33	2,029	.08	.09
June	33	25	30	1,785	.08	.09
July	29	25	26	1,599	.06	.07
August	29	29	29	1,783	.07	.08
September	29	29	29	1,726	.07	.08
October	33	29	32	1,968	.08	.09
November	3,200	33	139	8,271	.35	.39
December	33	33	33	2,029	.08	.09
The year	3,200	25	45	32,204	.11	1.49

Estimated monthly discharge of Mohave River at Victorville—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	4,180	50	183	11,252	0.46	0.53
February	4,820	50	925	51,372	2.31	2.41
March	660	50	178	10,945	.45	.52
April	44	44	44	2,618	.11	.12
May	49	49	49	3,013	.12	.14
June	42	42	42	2,499	.11	.12
July	40	40	40	2,460	.10	.12
August	50	50	50	3,074	.13	.15
September	55	55	55	3,273	.14	.16
October	69	69	69	4,243	.17	.20
November	77	77	77	4,582	.19	.21
December	73	73	73	4,489	.18	.21
The year	4,820	40	149	103,820	.37	4.89
1902.						
January	53	47	50	3,074	.13	.15
February	63	58	60	3,332	.15	.16
March	66	66	66	4,058	.17	.20
April	67	47	59	3,511	.15	.17
May	49	37	43	2,644	.11	.13
June	53	47	50	2,975	.13	.14
July	41	38	40	2,460	.10	.12
August	48	33	40	2,460	.10	.12
September	(a)	(a)	(a)	2,618	.11	.12
October	49	45	47	2,890	.12	.14
November	50	43	46	2,737	.12	.13
December	69	55	65	3,997	.16	.18
The year	69	33	51	36,756	.13	1.76

a Estimated.

MOKELUMNE RIVER.

The Mokelumne River drains 537 square miles of the western slopes of the Sierra Nevada above Electra, Cal. A gaging station was established at this point by Burr Bassell, C. E., while employed by the Standard Electric Company. Daily gage readings were taken from January 1 to June 30, 1901, and numerous meter measurements were made.

Discharge measurements of Mokelumne River, Amador County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality
1900.		*Feet.*	*Second-feet.*	
Sept. 12	S. G. Bennett		37	Amador ditch at Camp Tabeaud.[a]
Sept. 12	do		4.8	Butte ditch above Electra.
1901.				
Jan. 8	B. Bassell	5.9	1,717	Electra.
Feb. 4	do	4.2	608	Do.
Feb. 15	do	4.8	966	Do.
Feb. 19	do	11.0	13,213	Do.
Feb. 22	do	8.6	6,330	Do.
Feb. 26	do	7.4	3,846	Do.
Mar. 4	do	6.6	2,723	Do.
May 3	do	6.2	2,232	Do.
May 21	do	6.7	3,016	Do.
1902.				
Aug. 14	E. T. Perkins		51	Do.
Aug. 14	do		30	Electra power plant discharge.
	Total		81	
1895.				
Jan. 6	J. B. Lippincott	12.25	1,063	Lodi.[b]
Mar. 20	do	8.0	1,068	Do.
Aug. 27	do	1.3	91	Do.
1899.				
Aug. 20	do		56	Do.
Sept. 14	S. G. Bennett		33	Mokelumne Hill.

[a] Capacity of ditch, 64 second-feet; 25 second-feet carried out of basin to Jackson and Sutter Authority, Burr Bassell.

[b] The Woodbridge diversion dam, 2 miles below Lodi, affects gage heights.

Discharge measurements of Mokelumne River, Amador County—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
1900.		*Feet.*	*Sec.-feet.*	
Sept. 12	S. G. Bennett		15	Mokelumne Hill.
1902.				
Aug. 12	do	2.8	40	Woodbridge Canal at head.
Aug. 16	L. Lawson	3.0	29	Do.
Aug. 12	S. G. Bennett		33	At Woodbridge.
Aug. 13	do	1.0	67	¼ mile below Lancha Plana dam.
Aug. 14	E. T. Perkins		51	Amador ditch, ¼ mile above tunnel.
Aug. 14	do		53	Standard Power Canal at flume No. 59, near Electra.
Aug. 15	do		21	Mokelumne ditch in flume, South Fork Mokelumne River.
Aug. 15	do		1.7	Middle Fork, 150 feet below bridge near West Point.
Aug. 15	do		61	North Fork, ⅛ mile above bridge near West Point.
Aug. 16	do		4.8	Mokelumne ditch, 2 miles southeast Fort Mountain, South Fork.
Aug. 14	L. Lawson		65	Clements.
Aug. 15	do		126	¼ mile below Lancha Plana dam.

Estimated monthly discharge of Mokelumne River at Lone Star Mills.[a]

[Drainage area 657 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November[b]	----------	----------	33	1,964	0.05	0.06
December[b]	----------	----------	33	2,029	.05	.06
1879.						
January[b]	2,107	----------	328	20,168	.50	.58
February	7,575	134	1,198	66,534	1.82	1.89
March	3,420	676	1,369	84,177	2.08	2.40
April	5,072	1,579	3,065	182,380	4.67	5.21
May	6,170	1,348	3,247	199,650	4.94	5.69
June	5,610	1,579	3,629	215,941	5.52	6.16
July	1,117	288	538	33,080	.82	.95
August[b]	----------	----------	164	10,084	.25	.29
September[b]	----------	----------	26	1,547	.04	.04
October[b]	----------	----------	19	1,168	.03	.03
November[b]	----------	----------	59	3,511	.09	.10
December	624	224	465	28,592	.71	.82
The year	----------	----------	1,175	846,832	1.79	24.16
1880.						
January	288	256	279	17,155	.42	.48
February	520	288	396	22,778	.60	.65
March	728	520	644	39,598	.98	1.13
April	9,642	728	4,553	270,922	6.93	7.73
May	8,071	3,048	5,031	309,344	7.66	8.83
June	7,326	4,685	6,054	360,238	9.21	10.27
July	5,201	572	2,745	168,783	4.18	4.82
August	480	134	365	22,443	.55	.63
September	134	----------	29	1,726	.04	.04
October[b]	----------	----------	164	10,084	.25	.29
November[b]	----------	----------	98	5,831	.15	.17
December	998	----------	291	17,893	.44	.51
The year	----------	----------	1,721	1,246,795	2.61	35.55

[a] Authority, California State engineering department.

[b] Estimated from run-off of neighboring streams and from previous measurements.

Estimated monthly discharge of Mokelumme River at Lone Star Mills—Cont'd.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	8,536	192	1,037	63,763	1.58	1.82
February	8,852	624	3,049	169,333	4.64	4.83
March	2,701	728	1,126	69,235	1.71	1.97
April	4,556	1,810	3,195	190,116	4.86	5.42
May	4,298	1,579	3,034	186,553	4.62	5.32
June	2,701	572	1,237	73,607	1.88	2.10
July	520		159	9,777	.24	.28
August[a]			98	6,026	.15	.17
September[a]			98	5,831	.15	.17
October[a]			66	4,058	.10	.12
November[a]			207	12,317	.32	.36
December[a]			624	38,368	.95	1.10
The year			1,160	828,984	1.77	23.66
1882.[a]						
January			591	36,339	.90	1.04
February			624	34,655	.95	.99
March			1,971	121,192	3.00	3.46
April			2,628	156,377	4.00	4.46
May			4,927	302,949	7.50	8.65
June			3,285	195,471	5.00	5.58
July			788	48,452	1.20	1.38
August			66	4,058	.10	.12
September			59	3,511	.09	.10
October			230	14,142	.35	.40
November			207	12,317	.31	.35
December			207	12,728	.31	.36
The year			1,298	942,191	1.98	26.89

[a] Estimated from run-off of neighboring streams and from previous measurements.

Estimated monthly discharge of Mokelumne River at Lone Star Mills—Cont'd.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1883.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			414	25,456	0.63	0.73
February			328	18,216	.50	.52
March			591	36,339	.90	1.04
April			1,971	117,283	3.00	3.35
May			3,942	242,384	6.00	6.92
June			2,628	156,377	4.00	4.46
July			657	40,397	1.00	1.15
August			263	16,171	.40	.46
September			98	5,831	.15	.17
October			98	6,026	.15	.17
November			132	7,855	.20	.22
December			132	8,116	.20	.23
The year			938	680,451	1.43	19.42
1884.[a]						
January			164	10,084	.25	.29
February			1,971	113,373	3.00	3.24
March			3,942	242,384	6.00	6.92
April			3,942	234,565	6.00	6.69
May			3,285	201,987	5.00	5.76
June			2,957	175,954	4.50	5.02
July			2,628	161,589	4.00	4.61
August			657	40,397	1.00	1.15
September			131	7,795	.20	.22
October			98	6,026	.15	.17

[a] Estimated from run-off of neighboring streams and from previous measurements.

Estimated monthly discharge of Mokelumne River at Electra.[a]

[Drainage area, 537 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	4,600	330	1,000	61,488	1.86	2.14
February	13,210	610	3,302	183,384	6.15	6.40
March	4,020	1,130	2,004	123,221	3.73	4.30
April	3,160	950	2,040	121,388	3.80	4.24
May	9,980	1,960	4,627	284,503	8.62	9.93
June	6,790	1,350	3,833	228,145	7.14	7.97
July			260	15,987	.48	.55
August			190	11,683	.35	.40
September			60	3,570	.11	.12
October			76	4,673	.14	.16
November			210	12,496	.39	.44

[a] Authority, United States Geological Survey.

MONO LAKE DRAINAGE.

Discharge measurements in Mono Lake drainage basin, Mono County, Cal.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
July 29, 1902	F. H. Olmsted	46.72	Mill Creek, just below Lundy Lake and above all diversions.
July 30, 1902	do	89.00	Leevining, just above Rhinedollar Lake.
Aug. 1, 1902	do	26.36	Walker Creek, easterly from Bloody Canyon.
Do	do	21.65	Parker Creek.
Do	do	62.40	Rush Creek, above Silver Lake.

NIAGARA CREEK.

See Stanislaus River, Niagara Creek.

OWENS RIVER.

Discharge measurements of Owens River, Inyo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. 4, 1902	F. H. Olmsted	26.87	Mammoth Creek at sawmill.
Do	do	37.14	Convict Creek near crossing of Bishop road.

PACOIMA CANYON.

See Los Angeles River, Pacoima.

PADARO CREEK.

Discharge measurement of Padaro Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Aug. —, 1899	G. F. Wright	0.31

PALLETT CREEK.

See Big Rock Creek, Pallett Creek.

PASADENA MESA.

UNDERGROUND WATER OBTAINED FROM THE BED OF ARROYO SECO AND PASADENA MESA.

An examination of the underground water supply in the vicinity of Pasadena was made by Mr. J. B. Lippincott in October, 1898, the results of which are given in the following paragraphs:

Pasadena Mesa, lying south of the Sierra Madre, is bounded on the west, along the eastern bank of Arroyo Seco, by a low range of granite and clay hills; on the south by Raymond Hill, which is of sandstone, and by a dike, the capping of which apparently consists of adobe or clay. This dike extends from Raymond Hill, on the south side of the city of Pasadena, in a direction a little north of east, through Sunny Slope and Baldwin ranches to the base of the Sierra Madre near the mouth of Santa Anita Canyon. The mesa proper consists of deposits of sand, gravel, and bowlders, the larger bowlders lying near the mountains and the finer material near the southern slope. The voids in this absorbent material act as a storage reservoir, being filled by the flood waters issuing from the steep slopes on the southern face of the Sierra Madre. The underground waters are reenforced by the return water from irrigation on the mesa. From 1893 to 1902, inclusive, was a period of unusual drought, but most of the developments were new in 1898.

Arroyo Seco, draining 21 square miles of the Sierra Madre, issues from these mountains on the north side of Pasadena Mesa, passes through an opening in a granite spur known as Devils Gate, and joins Los Angeles River at Los Angeles. Between the point where the water from this basin issues from the mountains and Devils Gate lies a broad river bottom 2 miles in length, composed of coarse material. In passing over this the water sinks rapidly, diminishing in volume from the mouth of the canyon to Devils Gate.

Pasadena water companies have built extensive development tunnels above Devils Gate, cross cutting beneath the eastern bank and under the mesa land. A submerged dam at Devils Gate assists the tunnel developments by intercepting the underflow. An examination of these tunnels shows that no impervious stratum is encountered after the granite ledge at Devils Gate is passed. Of the water obtained from these development works, 69 per cent is gained from the portion of the tunnel which is beneath the mesa. A well about

FIG. 3.—Map showing location of wells near Pasadena.

4,000 feet upstream from the tunnel and 200 feet deep, in the bed of the wash near the mouth of the mountain canyon of the Arroyo Seco, was drained by the extension of this line of tunnels under Pasadena Mesa.

From the investigations the conclusion is reached that the water from Arroyo Seco which sinks between the mouth of the canyon proper and Devils Gate passes under the eastern bank of Arroyo Seco between these points and augments the underground water of

Pasadena Mesa. Otherwise it would be difficult to account for the large amount of water which is obtained from the lower development works at the southern dike of Pasadena Mesa. This mesa is underlain throughout with a sheet of water extending from the foot of the mountains, where its depth below the surface is from 150 to 200 feet, to the dike at its southern exposure, where the water is practically at the surface, making itself manifest in numerous small springs which rise in drainage lines on the southern face of the dike. With the exception of the Arroyo Seco developments, which in the tabulations are classified by themselves, the principal water product of this mesa is obtained along these drainage lines from the springs. Numerous wells from which water is pumped have been sunk and tunnels have been run through the dike into the water-bearing gravel.

An interesting feature of these development works is the constant strife existing between the various tunnel and well owners along the dike. For instance, the owner of a certain piece of property discovered by a tunnel the presence of a considerable body of water on his land; his neighbor to the south, whose land is at a lower elevation, drained the first tunnel by digging another on a lower grade and extending it to his northern property line. This has been done repeatedly, in some cases the water having been so diverted by two or three owners in succession.

The wells are usually bored and are lined with 7-inch casing. South of the Santa Fe Railroad a charge of 50 cents a foot is made for completing the first 50 feet in depth of the well, with an increase of 50 cents per foot for each additional 50 feet in depth. North of the railroad, where the bowlders are larger, a charge of from 10 to 20 per cent more is made for boring. These prices do not include the cost of casing. The data given below concerning depth of wells and depth of water were in nearly all cases obtained from statements made by the owners.

On the following pages is given a compilation of facts with reference to the depth of water in wells through the district and a summary of the water crop from the principal development works. It has been impossible to form an exact estimate of the amount of water taken for domestic use and for minor irrigation purposes from the large number of small wells on the mesa, but the water from the larger developments has been accurately measured and included in this summary.

DESCRIPTION OF WELLS IN PASADENA MESA.[a]

1. Gidding; on Colorado street between Hollister and Chester streets; elevation, 815 feet; depth to water, 103 feet; dug mostly through gravel with no hardpan; digging cost $1 per foot and 25 cents extra for every 25 feet additional; 109 feet deep, with 6 feet of water; elevation of water, 712 feet.

[a] The unit of measurement is the California miner's inch, which is 0,02 of 1 cubic foot per second.

2. McCallum; Colorado street, in McCallum wash; elevation, 785 feet; 151 feet deep; was dug originally 83 feet; at 90 feet sandstone for 10 feet; 101 feet from surface to water; 50 feet of water; elevation of water, 684 feet; water raised by windmill.

3. Hoover; a bored well with windmill; 115 feet deep, with 17 feet of water; elevation, 775 feet; water elevation, 677 feet.

4. Moses; bored well; 200 feet deep; elevation 790 feet; water elevation, 684 feet; originally 100 feet of water, now 94 feet, commencing 106 feet from the surface; 1½-horsepower gasoline engine with 8-inch stroke, 3-inch cylinder, pumping 1,000 gallons an hour.

5. King; 227 feet deep; elevation, 800 feet; water elevation, 678 feet; originally 117 feet of water, now about 105 feet; water raised by an engine with 12-inch stroke and 4-inch cylinder, pumping 2,500 gallons per hour.

6. Stevens; 121 feet deep; 31 feet of water; 90 feet to water surface; elevation, 781 feet; water elevation, 691 feet; was dug thirteen years ago.

7. McAdam; 150 feet deep; 57 feet from surface to water; elevation, 740 feet; water elevation, 683 feet.

8. Merwin; 95 feet deep; 55 feet to water; elevation, 735 feet; water elevation, 680 feet; pump capacity, 20 gallons per minute; costs 3½ to 4 cents an hour to run engine with gasoline.

9. Butler; bored well; 93 feet deep; 48 feet from surface to water, originally 40 feet; elevation, 718 feet; water elevation, 670 feet.

10. Hutchinson; bored well; 230 feet deep; 36 feet from surface to water; elevation, 713 feet; water elevation, 677 feet; well bored through clay; pressure comes from below.

11. Daniels; 107 feet deep; 40 feet from surface to water; water 67 feet deep; elevation, 715 feet; water elevation, 675 feet; strata of clay and bowlders with coarse gravel at bottom were encountered.

12. Hodge; 169 feet deep; 33 feet to water; elevation, 725 feet; water elevation, 692 feet.

13. Miles; bored well; 225 feet deep; 143 feet to water; elevation, 817 feet; water elevation, 674 feet.

14. Wilkeson; 177 feet deep; 30 feet from surface to water; elevation, 720 feet; water elevation, 690 feet; Jack Butler, well borer, says that wells during 1898 were 15 feet lower than in previous years.

15. Ackerman; bored well; 149 feet deep; 75 feet from surface to water; elevation, 710 feet; water elevation, 635 feet.

16. Thorndyke; 275 feet deep; 30 feet from surface to water; elevation, 705 feet; water elevation, 675 feet; fine clay encountered at 69 feet and 73 feet from surface, the remainder being gravel strata.

17. Lamanda Park; 180 feet deep; originally 80 feet from surface to water; elevation, 740 feet; present water elevation, 680 feet.

18. Titus; 558 feet deep; from surface to water, 12 feet, originally 4 feet; elevation, 690 feet; water elevation, 678; several strata of cement 1 inch thick were encountered.

19. Butler; 175 feet deep; 75 feet from surface to water; elevation, 720 feet; water elevation, 645 feet.

20. Graves; 88 feet deep; 40 feet from surface to water; elevation, 720 feet; water elevation, 680 feet.

21. Krouser; 113 feet deep; 15 feet from surface to water; elevation, 700 feet; water elevation, 685 feet.

22. Wakefield; 60 feet deep; originally 20 feet to water, now 30 feet; elevation, 703 feet; water elevation, 673 feet.

23. Pavey; 360 feet deep; water elevation, 670 feet; originally flowed 16 miner's inches of water; still flowing, but in less volume.

24. Chapman; flowing well; 175 feet deep. There are about 12 wells flowing on this ranch.

25. Hassleys; 500 feet deep; elevation, 600 feet; originally artesian, but now cut by a tunnel at a lower elevation.

26. Raymond; 40 feet to water, which is 4 feet deep; water fell 2 feet during season of 1898; 91 miner's inches of water were pumped from this well during October, 1898; well is brick lined and 12 feet in diameter.

27. Marengo tunnel; run into Raymond's hill at Terminal Railway, Fair Oaks station; it is discharging 18 miner's inches. This tunnel drained a small tunnel on the west side of Fair Oaks avenue.

28. Fluer; dug well, Ipswich street; depth, 48 feet; water, 12 feet; dug in October, 1897; at first there was a supply of 50 miner's inches, but the supply has diminished to 30 miner's inches; a 6-inch centrifugal pump, with 20-horsepower engine, pumps out the well in 1.5 hours.

29. Stoneman tunnel; was first run in 1892, 178 feet, and in summer of 1898 was extended 164 feet; flows 14.4 miner's inches.

30. Graves tunnel; 530 feet of tunnel and about 100 feet of ditch; water 26 feet below the surface of the ground at the upper end; 20 miner's inches of water obtained.

31. Oak Knoll; about the same class as Rhodes well and discharging the same amount of water, 4 miner's inches.

32. Brickyard well; near Lake avenue, northeast from Oak Knoll; 40 feet of well are through clay, 7 feet through sand and gravel; 7 miner's inches of water is obtained; this is a brick-lined dug well.

33. Rhodes well; near corner of Lake avenue and Hawkeye street; 49 feet deep and water approximately 8 feet in depth; steam plant, 15-horsepower boiler, with Smith valve pump; a continuous flow of 4 miner's inches is obtained.

34. Alhambra water, in Mayberry Canyon; 64 miner's inches is obtained, which is not the full capacity of the plant. There are six wells, from 350 to 750 feet deep, of which five are being pumped and one flows.

35. Patton tunnel, near Kewen Lake; produces 7 miner's inches.

36. Surface water; Patton water in West Canyon, 2 miner's inches.

37. Patton water, East Canyon; 24 miner's inches. (San Gabriel water not included in this.)

38. San Gabriel Mission; 24.9 miner's inches; comes from the same canyon as Patton water in East Canyon; it is surface water and has been reduced by development works.

39. Shorb water; from tunnel under orange grove on Shorb place; approximately 2 miner's inches is obtained. In small canyon northwest of house there is a stream, approximately 5 miner's inches; there are three artesian wells (No. 42) southeast of the ranch house, from which 17 miner's inches is obtained.

60. Lower Painter well; dug in 1894; 96 feet deep; water, 79 feet from surface; elevation, 1,040 feet; water elevation, 961 feet; this is a 4-foot by 7-foot dug well, the material passed through being large bowlders.

61. Upper Painter well; dug well much resembling No. 60; 162 feet deep; 132 feet to water; elevation, 1,129 feet; water elevation, 997 feet.

62. Becker; 200 feet deep; depth to water, as measured in May, 1898, 173 feet; a 6-horsepower gasoline engine is used which has pumped 5 miner's inches; it is a bored well; cost $250, including casing ($1 per foot plus 25 cents additional for each 50 feet additional depth); elevation, 825 feet; water elevation, 652 feet.

63. Stafford; bored well; 241 feet deep; depth to water, 173 feet; elevation, 825 feet; water elevation, 652 feet.

64. Krank; 300 feet deep; 290 feet to water; elevation, 1,070 feet; water elevation, 780 feet.

65. Meers; on E street; 300 feet deep; 75 feet of water in August, 1897; elevation, 1,060 feet; water elevation, 835 feet.

66. Stone; 100 feet deep; 85 feet to water; elevation, 1,040 feet; water elevation, 955 feet; approximately 15 miner's inches is obtained when pump is run. This is a dug and timbered well and cost for excavation $1.75 per vertical foot until water was struck; passed through, say, 65 feet of gravel, 15 feet of sand, and 12 feet of clay.

67. Called Painter well; 170 feet to water; 14 feet lower ground than No. 41; water elevation, 830 feet.

50. Hurlbut; bored well, about 1,300 feet deep; 95 feet through clay; but little water; elevation, 816 feet; water elevation, 745 feet.

26. Olmsted; 39 feet deep; elevation, 750 feet; water elevation, 740 feet; the usual depth of water from the surface is 8 feet, but in October, 1898, was 10.5 feet.

51. Pasadena and Pacific power-house well; elevation, 750 feet; water stands 11 feet from original surface of ground; water elevation, 739 feet.

52. Baker; 35 feet deep; elevation, 740 feet; water elevation, 734 feet; supply is said to come from northeast.

53. Pasadena West Side Water Company; about 70 feet deep and 3 feet to water; elevation, 718 feet; water elevation, 715 feet; water comes from northeast.

68. Morehouse; cesspool at this point of 70 feet and no water is encountered; surface elevation, 790 feet.

69. On top of a hill 500 feet east of No. 53; 60 feet deep and no water found; surface elevation, 825 feet.

74. In Arroyo Seco, at mouth of canyon; 250 feet deep and dry.

Amount of water developed in Pasadena Mesa, October, 1898.

[1 miner's inch is 0.02 of 1 cubic foot per second.]

	Miner's inches.
27. Raymond Improvement Company's tunnel at Fair Oaks avenue	18
26. Marengo well, near Atchison, Topeka and Santa Fe station, Raymond	91
26. Surface water in Marengo Canyon, near railroad crossing (Southern Pacific)	20
28. Fluer well on Ipswich street, near Santa Fe Raymond station; intermittent pumping	30
29. Las Roebles Water Company, near new Graves tunnel	14
29. Stoneman Canyon heads, near Fluer well	3
30. Walter Graves's new or upper tunnel	20
31. Oak Knoll well	4
32. Brickkiln well	7
33. C. H. Rhodes's well, near Lake avenue and Hawkeye street	4
34. Alhambra water, artesian wells and air-compressing plant	64
35. Patton tunnel, near Kewen Lake	7
36. Patton water in west canyon	2
37. Patton water from east canyon	24
38. San Gabriel Mission water	25
39. Shorb water northwest from ranch house	5
39a. Shorb water in tunnel southwest of ranch house	2
40. Graves's lower tunnel (dry)	0
41. Richardson's two tunnels, near Kewin Lake	18
42. Shorb's three artesian wells southeast of house	17
43. Pump, 13 inches; artesian, 3 inches; tunnel, 22 inches; all belong to Shorb	38

	Miner's inches.
44. Rose well, east side Santa Anita avenue	20
45. Winston wells, Santa Anita avenue	12
46. Alexander water, east of Santa Anita avenue	25
47. Titus ranch	19
48. Sunny Slope developments	66
59. Chapman	106
Total	661

Developments near Devils Gate by the United Water Companies.

56. Pumped from well below Devils Gate, but entering tunnel above sand box	7
57. Weir at mouth of northeast tunnel	8
58. Weir at mouth of northwest tunnel	123
Total from Devils Gate	138
59. Total from North Branch	118
Total from submerged dam and from under arroyo above dam	5
Flow from the 900-foot tunnel, east bank of arroyo, or six-tenths of whole Devils Gate flow from tunnels	77
70. Richardson tunnel below Devils Gate	24
71. Wilson tunnel below Devils Gate	10
Developed at Devils Gate	138
Total upper arroyo development	172
42. Upper Painter well	37
41. Lower Painter well	40
48. Stone well	15
Pump near reservoir No. 1	22
Total	114
72. Sheep Corral Springs, in development cut	74
73. Above shaft No. 2, detail of No. 58	22

Summary of water development from Pasadena Mesa.

Devils Gate development	172
Sheep corral	74
Lower dike in 4½ miles	661
Total	907

PASTORIA CREEK.

Discharge measurement of Pastoria Creek, Kern County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Nov. 13, 1895	J. B. Lippincott	0.04	Mouth of canyon.
Dec. 15, 1896	do	0.00	Road crossing.

PESCADERO CREEK.

Discharge measurement of Pescadero Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Oct. 17, 1893	W. W. Brier	4.67	6 miles above Pescadero.

PILARCITOS CREEK.

Discharge measurement of Pilarcitos Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Oct. 17, 1893	W. W. Brier	0.80	3½ miles above Half Moon Bay.

PIRU CREEK.

Discharge measurements of Piru Creek, Ventura County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Mar. 10, 1895	J. B. Lippincott	0.27	3.54	Robertson Mill.
Jan. 21, 1896	S. Stewart		18.00	Smith's.
Jan. 31, 1896	J. B. Lippincott	1.75	13.30	Do.
Aug. 11, 1898	F. H. Olmsted		0.92	French House.
Dec. 15, 1896	J. B. Lippincott		.20	Gorman Creek below Gorman Station.
Mar. 16, 1899	S. G. Bennett		[a]61.00	At Piru City, wagon road crossing.
Mar. 17, 1899	do		[a]152.00	Do.
Mar. 14, 1899	do		5.00	Narrows, near Dutton's.
Aug. 19, 1899	do		1.30	Head of Piru pipe line.
Oct. 8, 1900	W. W. Cockins, jr		2.20	Lower Piru Creek, ditches from.

[a] Ditch is carrying 10 second-feet on both dates in addition.

PIT RIVER.

Discharge measurements of Pit River, Shasta County.

Date.	Hydrographer.	Discharge.	Locality.
1901.		*Sec.-feet.*	
Sept. —	Robt. McF. Doble	2,230	Peck's Bridge.
Sept. 9	S. G. Bennett	2,682	Silverthorn Ferry.
Sept. —	Robt. McF. Doble	177	Burney Creek, tributary of Pit River.
Sept. —	do	1,447	Fall River, near mouth.
Sept. —	do	627	Hat Creek, Carbon bridge.
Sept. 9	S. G. Bennett	23	Squaw Creek, near Copper City bridge.
1902.			
Sept. 17	do	208	Pit River above mouth of Fall River, at Fall River Mills.
Sept. 16	do	1,543	Fall River, at bridge.
Do	do	583	Hat Creek, at Carbon bridge.
Sept. 15	do	2,350	Peck's bridge.
Do	do	209	Burney Creek, ½ mile below Burney Falls.
Sept. 27	Chas. A. Miller	2,508	Silverthorn Ferry.
Do	do	37	Squaw Creek, near Copper City bridge.

PLUNGE CREEK.

Discharge measurements of Plunge Creek, at headworks in canyon, San Bernardino County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
June 12, 1898	J. B. Lippincott	2.30
Sept. 9, 1898	do	.20
Mar. 25, 1899	S. G. Bennett	10.90
Aug. 25, 1899	do	.50
July 12, 1900	do	.34
Apr. 7, 1902	do	12.40
Sept. 4, 1902	W. B. Clapp	.37

POMPONIO CREEK.

Discharge measurement of Pomponio Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
1893.		*Sec.-feet.*	
Oct. 17	W. W. Brier	0.27	2 miles above mouth.

POSO CREEK.

Estimated monthly discharge of Poso Creek at base of foothills.[a]

[Drainage area, 289 square miles.]

Month	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	0	0	0	0
December	0	0	0	0
1879.				
January	23	1,414	0.08	0.09
February	40	2,221	.14	.15
March	20	1,230	.07	.08
April	72	4,284	.25	.28
May	52	3,197	.18	.21
June	17	1,012	.06	.07
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	75	4,463	.26	.29
December	145	8,916	.50	.58
The year	37	26,737	13	1.75
1880.				
January	347	21,336	1.20	1.38
February	665	38,251	2.30	2.48
March	751	46,177	2.60	3.00
April	838	49,864	2.90	3.24
May	578	35,540	2.00	2.31
June	145	8,628	.50	.56
July	14	861	.05	.06
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	58	3,451	.20	.22
December	145	8,916	.50	.58
The year	294	213,024	1.02	13.83

[a] Authority, State engineer. Estimated from run-off of neighboring streams.

Estimated monthly discharge of Poso Creek at base of foothills—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1881.[a]	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	145	8,916	0.50	0.58
February	289	16,050	1.00	1.04
March	289	17,770	1.00	1.15
April	289	17,197	1.00	1.12
May	289	17,770	1.00	1.15
June	145	8,628	.50	.56
July				
August				
September				
October				
November	0	0	0	0
December	35	2,152	.12	.14
The year	123	88,483	.42	5.74
1882.[a]				
January	35	2,152	.12	.14
February	43	2,388	.15	.16
March	145	8,916	.50	.58
April	145	8,628	.50	.56
May	29	1,783	.10	.12
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	43	2,559	.15	.17
December	14	861	.05	.06
The year	38	27,287	.13	1.79

[a] Estimated from run-off of neighboring stream.

Estimated monthly discharge of Poso Creek at base of foothills—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1883.[a]	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	43	2,644	0.15	0.17
February	43	2,388	.15	.16
March	231	14,204	.80	.92
April	145	8,628	.50	.56
May	119	7,317	.41	.47
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	29	1,783	.10	.12
November	29	1,726	.10	.11
December	43	2,644	.15	.17
The year	57	41,334	.19	2.68
1884.[a]				
January	145	8,916	.50	.58
February	867	49,870	3.00	3.24
March	867	53,310	3.00	3.46
April	578	34,393	2.00	2.23
May	119	7,317	.41	.47
June	145	8,628	.50	.56
July	0		0	0
August	0		0	0
September	0		0	0
October	0		0	0

[a] Estimated from run-off of neighboring stream.

PURISSIMA CREEK.

Discharge measurement of Purissima Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
1893.		*Sec.-feet.*	
Oct. 17	W. W. Brier	2.03	1½ miles above Purissima.

PUTAH CREEK.

Discharge measurement of Putah Creek, Napa County.

Date.	Hydrographer.	Discharge.	Remarks.
1900.		*Sec.-feet.*	
Sept. 23	S. G. Bennett	4.4	6 miles above Winters, at Devils Gate.

RABEL DAM DITCH, SAN BERNARDINO COUNTY.

See San Bernardino Valley, Rabel dam ditch.

RANCHERO DITCH, SAN BERNARDINO COUNTY.

See San Bernardino Valley, Ranchero ditch.

RED HILLS DEVELOPMENTS.

See Cucamonga Creek, Red Hills.

REDLANDS CANAL.

See Santa Ana River, Redlands canal.

RINCON CREEK.

Discharge measurements of Rincon Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Aug. —, 1889	G. F. Wright	0.12
June 16, 1900	R. Moyer	.03

RUBICON RIVER.

See Middle Fork American River.

RIVERSIDE WATER COMPANY, UPPER CANAL.

See San Bernardino Valley.

SACRAMENTO RIVER.

This river rises in the extreme northeastern corner of California and flows in a general southerly direction, draining a large area in northern California between the Coast Range on the west and the Sierra Nevada on the east. It discharges into San Francisco Bay. A num-

ber of storage reservoirs have been constructed on the various tributaries of the river, and are used for hydraulic mining purposes and to a less extent for irrigation. The gaging station of the Geological Survey, established April 30, 1895, is located 12 miles above the town of Red Bluff at the crossing of the country road at Jellys Ferry. The gage consists of a vertical rod made in three sections and nailed firmly to trees near the ferry landing. A second rod is located 1,206 feet above the gage, and a third one 350 feet below the main rod, in order to determine the slope of the water surface. The three rods are referred to the same datum. Bench mark No. 1 is on an oak tree on the left bank of the river 300 feet below the cable, and is 22.429 feet above gage datum. The ferry cable is used in the discharge measurements. The channel for 1,000 feet above and below the station is nearly straight. The right bank is high, but the left bank is liable to overflow when the water rises above the 25-foot mark. The bed of the stream consists of gravel and changes only slightly. The gaging station of the State engineering department was at the mouth of the river.

Discharge measurements of Sacramento River.

Date.	Hydrographer.	Discharge.	Locality.
1878.		*Sec.-feet.*	
Oct. —	United States Engineers	6,425	Sacramento.
1879.			
May 12	State engineering department.	16,000	Knights Landing.
July 16	do	7,000	Sacramento Slough.
May 16	do	38,000	Gray & Shaws.
May 21	do	26,000	Above mouth of American River.
July 14	do	13,000	Do.
May 22	do	39,000	Sacramento, foot of I street.
July 14	do	15,000	Do.
Mar. 3	do	40,000	Freeport.
Mar. 20	do	56,000	Do.
Jan. 24	do	12,000	Brannan Slough.

Estimated monthly discharge of Sacramento River at Collinsville.[a]

[Drainage area, 26,187 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1878.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	8,000	476,033	0.31	0.35
December	9,000	553,388	.34	.39
1879.				
January	12,000	737,851	.46	.53
February	30,000	1,666,115	1.14	1.19
March	110,000	6,763,640	4.20	4.84
April	110,000	6,545,450	4.20	4.68
May	75,000	4,611,570	2.86	3.30
June	45,000	2,677,686	1.72	1.92
July	16,000	983,802	.61	.70
August	8,500	522,644	.32	.37
September	6,500	386,776	.25	.28
October	8,000	491,901	.30	.35
November	7,500	446,281	.29	.32
December	27,000	1,660,165	1.03	1.19
The year	37,958	27,493,881	1.45	19.67
1880.				
January	28,000	1,721,653	1.07	1.23
February	21,000	1,207,933	.80	.86
March	22,000	1,352,727	.84	.97
April	95,000	5,652,892	3.63	4.05
May	135,000	8,300,828	5.16	5.94
June	110,000	6,545,450	4.20	4.68
July	53,000	3,258,843	2.02	2.33
August	18,000	1,106,777	.69	.80
September	9,000	535,537	.34	.38
October	7,500	461,157	.29	.33
November	7,000	416,529	.27	.30
December	20,000	1,229,752	.76	.88
The year	43,792	31,790,078	1.67	22.75

[a] Authority, State engineer.

Estimated monthly discharge of Sacramento River at Collinsville—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1881.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	95,000	5,841,322	3.63	4.18
February	115,000	6,386,776	4.39	4.57
March	77,000	4,734,545	2.94	3.39
April	90,000	5,355,372	3.44	3.84
May	70,000	4,304,132	2.67	3.08
June	25,000	1,487,603	.95	1.06
July	14,000	860,826	.53	.61
August	8,000	491,901	.30	.35
September	6,500	386,777	.25	.28
October	7,000	430,413	.27	.31
November	8,200	487,934	.31	.35
December	16,000	983,802	.61	.70
The year	44,308	31,751,403	1.69	22.72
1882.				
January	24,000	1,475,702	.92	1.06
February	22,000	1,221,818	.84	.87
March	55,000	3,381,818	2.10	2.42
April	90,000	5,355,372	3.44	3.84
May	92,000	5,656,859	3.51	4.05
June	74,000	4,403,306	2.82	3.15
July	17,000	1,045,289	.65	.75
August	8,000	491,901	.30	.35
September	6,500	386,777	.25	.28
October	10,000	614,876	.38	.44
November	14,000	833,058	.53	.59
December	11,000	676,364	.42	.48
The year	35,292	25,543,140	1.35	18.28

Estimated monthly discharge of Sacramento River at Collinsville—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1883.	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	12,000	737,851	0.46	0.53
February	17,000	944,132	.65	.68
March	21,000	1,291,240	.80	.92
April	73,000	4,343,801	2.79	3.11
May	80,000	4,919,008	3.05	3.52
June	32,000	1,904,132	1.22	1.36
July	12,000	737,851	.46	.53
August	7,000	430,413	.27	.31
September	6,500	386,776	.25	.28
October	7,000	430,413	.27	.31
November	7,500	446,281	.29	.32
December	7,400	455,008	.28	.32
The year	23,533	17,026,906	.90	12.19
1884.				
January	12,000	737,851	.46	.53
February	24,000	1,380,496	.92	1.01
March	80,000	4,919,008	3.05	3.52
April	105,000	6,247,934	4.01	4.47
May	111,000	6,825,124	4.23	4.88
June	90,000	5,355,372	3.44	3.84
July	31,000	1,906,116	1.18	1.36
August	12,000	737,851	.46	.53
September	7,500	446,281	.29	.32
October	8,000	491,901	.30	.35

Discharge measurements of Sacramento River, Iron Canyon, 4 miles above Red Bluff, Tehama County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Oct. 30	S. G. Bennett	1.02	5,187
Dec. 13	do	2.68	9,651
1902.			
Jan. 28	do	1.35	5,912
Feb. 12	Wm. F. Luning	20.6	[a]110,824
Mar. 3	S. G. Bennett	10.6	41,570
May 10	do	5.5	18,927
Sept. 13	Chas. A. Miller	.84	4,425
Dec. 31	S. G. Bennett	3.20	9,858

[a] Float measurement.

Discharge measurements of Sacramento River at Red Bluff, Tehama County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.
1894.		*Feet.*	*Sec.-feet.*
Dec. 20	A. P. Davis and J. B. Lippincott	10.7	45,000
1895.			
Mar. 19	J. B. Lippincott	4.8	15,461
Apr. 27	do	8.4	36,181
1896.			
Jan. 21	do	20.8	109,432
Jan. 22	do	17.7	83,558

Estimated monthly discharge of Sacramento River at Red Bluff, Tehama County.[a]

[Drainage area, 9,356 square miles.][b]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	123,000	15,220	47,267	2,906,320	5.052	5.824
February	65,600	13,860	26,792	1,487,940	2.864	2.982
March	85,360	15,220	32,517	1,999,418	3.475	4.007
April	33,880	26,670	29,566	1,759,300	3.160	3.526
May	48,600	16,840	30,238	1,859,250	3.232	3.726
June	18,600	9,040	12,764	759,510	1.717	1.522
July	9,040	6,150	7,235	444,863	1.364	.892
August	6,150	5,990	6,057	372,436	.647	.746
September	10,820	5,830	6,321	376,106	.676	.754
October	6,285	5,910	5,989	368,261	.640	.738
November	6,690	5,910	6,046	359,792	.646	.711
December	36,880	6,150	10,095	620,760	1.079	1.244
Per annum	123,000	5,830	18,390	13,313,956	1.9656	26.672
1896.						
January	140,000	6,150	51,702	3,179,032	5.53	6.41
February	46,860	9,040	15,231	876,120	1.63	1.76
March	74,050	9,700	25,533	1,569,981	2.73	3.15
April	72,910	16,370	30,708	1,827,271	3.28	3.61
May	81,030	19,660	35,019	2,153,252	3.74	4.35
June	21,150	8,600	13,599	809,215	1.45	1.62
July	8,380	5,990	6,907	424,694	.74	.85
August	5,910	5,660	5,738	352,858	.61	.70
September	5,830	5,660	5,696	338,977	.61	.68
October	6,555	5,660	5,730	352,336	.61	.70
November	57,200	5,660	11,260	670,058	1.20	1.34
December	106,880	11,380	33,316	2,048,546	3.56	4.09
The year	140,000	5,660	20,037	14,602,340	2.14	29.26

[a] Authority, United States Geological Survey.

[b] Drainage areas were measured from maps of United States Geological Survey.

Discharge measurements of Sacramento River at Jellys Ferry, Tehama County.

Date.	Hydrographer.	Gage height.	Discharge.
1895.		*Feet.*	*Sec.-ft.*
Apr. 30	J. B. Lippincott	12	27,255
June 30	do	6.75	8,456
Aug. 25	A. P. Davis and J. B. Lippincott	5.55	5,452
Oct. 5	J. B. Lippincott	5.5	6,046
1896.			
Jan. 21	J. B. Lippincott	25.9	105,000
Jan. 22	do	22.7	82,000
July 7	C. C. Babb	6.6	6,924
Nov. 1	Richard Gernon	5.9	6,773
1897.			
Mar. 29	Fred Lemstrom	14.4	28,319
Mar. 13	do	10.3	18,568
Apr. 3	J. B. Lippincott	10.85	21,519
Apr. 16	Fred Lemstrom	12.2	25,806
Apr. 30	do	10.3	18,544
May 14	do	9	14,719
May 28	do	7.5	10,193
June 11	do	6.5	7,277
June 28	do	6.42	6,493
July 13	do	5.95	5,032
July 28	do	5.7	5,082
Aug. 13	do	5.6	4,285
Aug. 28	do	5.5	4,490
Sept. 13	do	5.5	4,257
Sept. 28	do	5.5	4,418
Oct. 13	do	5.6	4,591
Oct. 28	do	5.7	4,202
Nov. 13	do	5.7	4,196
Nov. 28	do	5.95	6,179
Dec. 13	do	7.4	10,151
Dec. 17	J. B. Lippincott	6.85	8,802
Dec. 28	Fred Lemstrom	5.95	6,105

Discharge measurements of Sacramento River at Jellys Ferry, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1898.		*Feet.*	*Sec.-ft.*
Jan. 28	Fred Lemstrom	5.7	5,578
Feb. 21	do	8.3	13,118
Feb. 28	do	15.32	42,020
Mar. 13	do	6.95	9,495
Mar. 28	do	6.1	7,155
Apr. 13	do	6.1	7,216
Apr. 27	do	6.2	7,606
May 13	do	5.5	5,473
May 28	do	7.92	12,477
June 3	J. B. Lippincott	7.1	9,048
June 13	Fred Lemstrom	5.9	6,162
June 28	do	5.45	5,093
July 13	do	5.2	4,625
July 28	do	5.1	4,520
Aug. 13	do	5	4,324
Aug. 27	do	5	4,089
Sept. 13	do	5	4,160
Sept. 28	do	5.1	4,322
Oct. 12	do	5.15	4,380
Oct. 28	do	5.15	4,271
Nov. 28	do	5.2	4,662
Dec. 13	do	5.2	4,367
Dec. 28	do	5.3	4,462
1899.			
Jan. 14	Fred Lemstrom	11.4	21,211
Jan. 28	do	7.5	10,299
Feb. 13	do	5.9	5,848
Feb. 28	do	6.1	6,380
Mar. 13	do	6.15	6,644
Mar. 29	do	11.5	21,985
Apr. 13	do	7.8	10,659
Apr. 28	do	7.3	7,813
May 13	do	6.65	7,630
June 3	do	6.9	8,409
June 13	do	5.9	6,104
June 28	do	5.5	4,866
July 13	do	5.25	4,276
July 28	do	5.05	4,025
Aug. 13	do	5.0	3,969
Aug. 28	do	5.0	3,764
Sept. 13	do	5.0	4,087
Sept. 28	do	5,0	4,009

Discharge measurements of Sacramento River at Jellys Ferry, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1900.		*Feet.*	*Sec.-ft.*
Feb. 17	Richard Gernon	6.8	8,374
Apr. 29	do	7.1	9,586
May 28	do	6.4	7,173
Sept. 20	S. G. Bennett	5.0	4,105
Dec. 18	do	10.0	18,361
1901.			
Jan. 27	S. G. Bennett	9.46	15,908
Apr. 9	do	7.8	11,112
Sept. 2	do	4.9	4,390

Estimated monthly discharge of Sacramento River at Jellys Ferry, Tehama County.

[Drainage area, 9,134 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1896.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	130,050	6,360	46,152	2,837,813	5.05	5.86
February	34,460	10,070	15,468	889,764	1.69	1.82
March	62,870	11,310	24,099	1,481,801	2.64	3.05
April	59,500	16,920	25,793	1,534,819	2.82	3.14
May	75,120	19,300	30,941	1,902,543	3.39	3.91
June	20,515	9,200	14,217	846,018	1.56	1.74
July	8,960	6,720	7,591	466,789	.83	.95
August	6,720	6,180	6,394	393,201	.70	.81
September	6,360	6,000	6,204	369,163	.68	.75
October	8,000	6,000	6,163	378,960	.67	.77
November	43,000	6,360	11,965	712,014	1.31	1.46
December	93,000	8,480	22,318	1,372,304	2.44	2.82
The year	130,050	6,000	18,109	13,185,189	1.98	27.08

Estimated monthly discharge of Sacramento River at Jellys Ferry, etc.—Cont'd.

Month.	Discharge.			Total discharge.	Run off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1897.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	49,765	8,320	14,280	878,050	1.56	1.80
February	89,100	17,420	36,108	2,005,335	3.95	4.11
March	44,340	13,100	21,790	1,339,825	2.39	2.76
April	28,710	18,830	22,807	1,357,108	2.50	2.79
May	18,520	9,200	13,737	844,660	1.50	1.73
June	9,200	6,680	7,620	453,420	.83	.92
July	6,550	5,120	5,699	350,420	.62	.71
August	5,120	4,600	4,776	293,667	.52	.60
September	4,600	4,600	4,600	273,718	.50	.56
October	6,680	4,600	4,955	304,673	.54	.62
November	8,600	5,120	5,590	332,627	.61	.68
December	16,940	5,380	7,792	479,114	.85	.98
The year	89,100	4,600	12,480	8,912,617	1.36	18.26
1898.						
January	6,525	5,835	6,120	376,307	.67	.77
February	33,600	5,835	12,479	693,049	1.37	1.43
March	22,500	6,525	9,745	599,201	1.07	1.23
April	7,260	6,525	6,872	408,911	.75	.83
May	10,800	5,375	6,632	407,789	.73	.84
June	10,500	5,150	6,674	397,130	.73	.81
July	5,150	4,475	4,700	288,994	.52	.60
August	4,475	4,250	4,276	262,923	.47	.54
September	4,475	4,250	4,280	254,677	.47	.53
October	4,925	4,475	4,631	284,751	.51	.59
November	6,892	4,475	4,785	284,727	.52	.58
December	5,950	4,700	4,991	306,887	.55	.63
The year	33,600	4,250	6,349	4,565,346	.70	9.38

Estimated monthly discharge of Sacramento River at Jellys Ferry, etc.—Cont'd.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	42,600	5,065	13,498	829,965	1.48	1.71
February	8,644	5,810	6,646	369,100	.73	.76
March	83,400	6,750	20,915	1,286,022	2.29	2.64
April	16,100	7,800	10,837	344,845	1.19	1.33
May	7,530	6,030	6,908	424,759	.76	.87
June	15,200	4,965	6,199	368,865	.68	.75
July	4,760	4,170	4,531	278,592	.50	.58
August	4,170	3,980	3,986	245,061	.44	.51
September	3,980	3,980	3,980	236,826	.44	.49
October	10,550	3,980	5,063	311,314	.55	.63
November	53,480	4,760	14,532	864,712	1.59	1.77
December	45,600	8,915	14,519	892,744	1.59	1.83
The year	83,400	3,980	9,301	6,752,805	1.02	13.87
1900.						
January	119,700	10,400	30,661	1,885,271	3.36	3.88
February	24,800	7,800	11,687	649,063	1.28	1.33
March	123,000	10,700	23,288	1,431,923	2.55	2.94
April	16,700	8,630	12,082	718,929	1.32	1.47
May	19,780	6,265	9,572	588,559	1.05	1.21
June	6,265	4,760	5,477	325,904	.60	.67
July	4,760	3,805	4,212	258,986	.46	.53
August	3,805	3,805	3,805	233,960	.42	.48
September	5,170	3,630	3,981	236,886	.44	.49
October	21,520	3,805	6,381	392,352	.70	.81
November	28,800	4,560	8,205	488,231	.90	1.00
December	80,100	6,030	15,553	956,317	1.70	1.96
The year	123,000	3,630	11,242	8,166,381	1.23	16.77

Estimated monthly discharge of Sacramento River at Jellys Ferry, etc.—Cont'd.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet*	*Sec.-feet.*	*Inches.*
January	74,240	8,915	20,983	1,290,194	2.30	2.66
February	101,880	9,800	34,138	1,895,928	3.74	3.89
March	46,100	12,200	20,628	1,268,366	2.26	2.61
April	16,700	9,200	10,870	646,810	1.19	1.33
May	13,700	7,530	9,804	602,824	1.07	1.23
June	7,265	4,965	5,596	332,985	.61	.68
July	4,760	3,980	4,365	268,393	.48	.55
August	3,980	3,805	3,850	236,727	.42	.48
September	5,380	3,630	3,922	233,375	.43	.48
October	5,380	3,980	4,194	257,879	.46	.53
November	44,100	4,360	7,745	460,859	.85	.94
December	61,800	5,380	12,149	747,013	1.33	1.53
The year	101,880	3,630	11,520	8,241,353	1.26	16.91
1902.						
January	6,750	4,760	5,376	330,557	.59	.68
February	151,320	5,660	69,153	3,840,563	7.44	7.75
March	61,700	14,150	27,371	1,682,977	2.94	3.39
April	53,800	14,150	21,992	1,308,615	2.37	2.64
May	24,460	10,150	17,803	1,094,663	1.92	2.21
June	13,450	7,060	9,998	594,922	1.08	1.20
July	7,060	5,880	6,192	380,731	.67	.77
August	5,880	5,440	5,674	348,881	.61	.70
September	5,220	5,000	5,007	297,938	.54	.60
October	11,750	5,000	5,931	364,683	.64	.74
November	118,200	5,660	19,834	1,180,204	2.13	2.38
December	39,100	8,110	17,506	1,076,402	1.88	2.17
The year	151,320	4,760	17,653	12,501,135	1.90	25.23

Discharge measurement of Upper Sacramento River, Shasta County, 1 mile above junction with Pitt River.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Sept. 10	S. G. Bennett		242

Discharge measurements of Sacramento River.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
1902.		*Feet.*	*Sec.-feet.*	
Sept. 22	Charles A. Miller		384	Castle Crags, Shasta County.
Do	S. G. Bennett		286	Bards Station, Shasta County.
Do	Charles A. Miller		15	Soda Creek at Castle Crags, Shasta County.
Sept. 14	do		4,455	Balls Ferry, Tehama County.
Sept. 15	do		313	Battle Creek, near Balls Ferry, Tehama County.
Do	do		27	Ditch from Battle Creek, near Balls Ferry, Tehama County.
	Total		340	
Sept. 26	S. G. Bennett	7.22	5,848	Sacramento, Sacramento County.

SALINAS RIVER.

Salinas River rises in San Luis Obispo County, flows in a northwesterly direction through Salinas Valley, and discharges into the Bay of Monterey. The crest of the Coast Range, locally known as the Santa Lucia Mountains, forms the boundary of the watershed on the south and west; the crest of the Gabilan Mountains and the Mount Diablo Range forms the eastern boundary of the watershed. The total area drained is 4,780 square miles. The principal tributaries of the river, Nacimiento and San Antonio creeks and Arroyo Seco, drain the eastern slopes of the Santa Lucia Mountains. The only important stream entering from the east is San Lorenzo Creek, which drains the western slopes of the Mount Diablo Range.

A reconnaissance survey for reservoir sites on Salinas River and its tributaries was made during the period from May 28 to August 31, 1900, under the direction of Prof. Charles D. Marx, of Stanford University. These studies were continued by Mr. Homer Hamlin during the years 1901 and 1902, and the results are being prepared for publication.

A gaging station was established on the river January 8, 1900, by D. A. Porter. On account of the shifting nature of the channel during floods, four gage rods were set between January 8 and April 2, 1900, and each was referred to a different datum. On June 8, 1900, a permanent station was established at the county bridge, 3¾ miles south of Salinas. The gage, which is vertical, is attached to one of the piers of the bridge. The bench mark is a nail in the washer in the top of a redwood post, 13 inches by 15 inches in size, on the north bank of the river, at an elevation of 20 feet above gage datum.

On account of the continual shifting of the stream bed and the improbability of its water being used for either power or irrigation purposes, the record on this stream was discontinued August 3, 1901.

Discharge measurements of Salinas River, near Salinas, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1900.		*Feet.*	*Sec.-feet.*	
Apr. 9	S. G. Bennett	4.20	25.51	
Apr. 9	D. A. Porter	4.20	26.04	
Apr. 12	do	4.15	15.44	Strong wind upstream.
Apr. 15	do	4.10	13.10	Do.
Apr. 19	do	4.10	17.04	No wind.
Apr. 22	do	4.25	33.85	Do.
Apr. 25	do	4.15	18.91	Strong wind upstream.
May 1	do	4.10	18.02	No wind.
May 4	do	4.10	16.40	Do.
May 7	do	4.10	17.50	Do.
May 12	do	4.10	17.85	Do.
May 16	do	4.10	17.94	Light wind.
May 19	do	4.10	16.23	Do.
May 24	do	4.1	17.20	No wind.
May 29	do	4.1	17.43	Do.
June 2	do	4.05	13.32	Windy.
June 5	do	4.05	15.29	No wind.
June 8	do	4.0	14.05	Do.
June 12	do	4.05	15.79	Do.
June 15	do	4.05	15.32	Light wind.
June 18	do	4.0	13.93	Do.
June 22	do	4.0	12.91	No wind.
June 26	do	4.0	11.47	Light wind upstream.
June 30	do	3.9	10.50	No wind.
July 3	do	3.65	9.96	Fresh wind upstream.
July 16	do	3.70	9.56	No wind.
Aug. 1	do	3.70	9.83	Do.
Aug. 18	do	3.65	9.88	Light breeze downstream.
Sept. 1	do	3.65	10.10	No wind.
Sept. 26	S. G. Bennett	3.45	1.7	
Oct. 23	J. B. Lippincott	3.45	1.7	
Oct. 26	W. W. Cockins, jr.		1.1	1 mile below sugar factory.
Nov. 14	do	3.7	8.6	
Nov. 16	do	4.2	31.6	
Nov. 19	do	6.7	2,056	
Nov. 20	do	5.9	829	
Nov. 21	do	5.6	743	
Nov. 22	do	15.6	33,600	Float.
Nov. 23	do	9.7	12,851	Do.

Discharge measurements of Salinas River, near Salinas, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1901.		*Feet.*	*Sec.-feet.*	
Jan. 15	S. G. Bennett	6.8	2,142	
Jan. 22	do	5.8	1,338	
Jan. 24	W. W. Cockins, jr	5.9	1,598	
Feb. 9	S. G. Bennett	7.9	4,982	
Feb. 19	do	6.05	1,561	
Apr. 12	W. W. Cockins, jr	4.7	342	
Mar. 17	do	5.6	1,204	
Mar. 24	do	5.2	668	
Mar. 30	do	4.9	541	
Apr. 6	do	4.75	512	

Estimated monthly discharge of Salinas River at a point 4 miles south of Salinas, Monterey County.

[Drainage area, 4,084 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Second-feet per square mile.	Depth in inches.
1900.						
January 8 to 31	2,700	223	848	40,368	0.21	0.19
February	223	40	105	5,831	.03	.03
March	223	25	73	4,489	.02	.02
April	32	19	22	1,309	.01	.01
May	19	17	17	1,045	.00	.00
June	17	15	16	952	.00	.00
July	10	6	8	492	.00	.00
August	8	6	7	430	.00	.00
September	8	2	6	357	.00	.00
October	4	1	2	123	.00	.00
November	33,600	0	2,413	143,583	.59	.66
December	1,050	82	295	18,139	.07	.08
The year	33,600	0	318	217,118	.08	.99

Estimated monthly discharge of Salinas River, etc.—Continued.

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Second-feet per square mile.	Depth in inches.
1901.						
January	35,162	380	4,921	302,580	1.21	1.39
February	20,927	540	4,172	231,701	1.02	1.06
March	1,772	430	1,063	65,361	.26	.30
April	405	160	270	16,066	.07	.07
May	2,012	160	533	32,773	.13	.15
June	160	30	56	3,332	.01	.02
July	30	25	27	1,660	.01	.01

Discharge measurements of Salinas River at bridge, Bradley, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Feb. 14	S. G. Bennett		1,424

TRIBUTARIES OF SALINAS RIVER.

ARROYO SECO.

This stream rises on the eastern slope of the Santa Lucia Mountains, flows eastward, and empties into Salinas River at Soledad, Cal. A gaging station was established December 30, 1900, by W. W. Cockins, jr., at Foster's ranch, near Piney, Cal. The high water of January, 1901, enlarged the old channel, and the gaging station was removed to Pettit's ranch, 4 miles below.

The purpose of establishing these gaging stations was to get the maximum flood discharge and the amount of water available for storage.

The total area of watershed drained above Pettit's ranch is 215 square miles.

Discharge measurements of Arroyo Seco, a tributary of Salinas River.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
1900.		*Feet.*	*Sec.-feet.*	
June 20, 2.30 p. m.	D. A. Porter		11.78	First pool above entrance of Santa Lucia, Monterey County.
June 20, 3.10 p. m.	do		12.42	Between second and third pools above entrance of Santa Lucia, Monterey County, Cal.
June 21, 8 a. m.	do		10.40	Road crossing of stream between Moor's and Abbott's houses, Monterey County, Cal.
June 21, 3.20 p. m.	do		7.30	200 feet above Currier's dam site, Monterey County, Cal.
June 21, 4.55 p. m.	do		6.14	50 feet below head gate Salina Valley Water Co.'s Arroyo Seco ditch No. 2. Canal was taking all water of creek on this date.
1901.				
Feb. 11	S. G. Bennett	3.70	535	Point near Foster's, Monterey County, Cal.
Mar. 26	W. W. Cockins, jr		162	Do.
Apr. 2	do	5.8	105	Pettitt's Ranch, Monterey County, Cal.
July 10	Homer Hamlin	5.3	23	Do.
Sept. 24	do		7.9	Do.
Nov. 6	H. E. Green	5.2	15	Do.
1902.				
Feb. 24	S. G. Bennett	8.2	[a]1,720	
Feb. 25	do	11.7	[a]7,883	
Feb. 26	do	9	[a]2,777	
Apr. 29	do	5.75	144	
July 18	Homer Hamlin	5.08	10.4	
Aug. 7	do	4.9	2.3	

[a] Float measurements.

Estimated monthly discharge of Arroyo Seco, a tributary of Salinas River, at Piney, Monterey County.

[Drainage area, 215 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	4,500	105	888	54,601	4.13	4.76
February	2,860	160	931	51,705	4.33	4.51
March	610	105	246	15,126	1.14	1.32
April	2,500	95	195	11,603	.91	1.01
May			95	5,841	.44	.51
June			58	3,451	.27	.30
July			22	1,353	.10	.12
August			15	922	.07	.08
September			8	476	.04	.04
October			10	615	.05	.05
November			22	1,309	.10	.11
December			26	1,599	.12	.14
The year			209	148,601	.98	12.95
1902.						
January	40	25	28	1,722	.13	.15
February	2,860	25	605	33,600	2.81	2.93
March	2,320	185	620	38,122	2.88	3.32
April	1,650	145	270	16,066	1.26	1.41
May	105	55	74	4,550	.34	.39
June	55	15	32	1,904	.15	.17
July	15	7	12	738	.06	.07
August	7	3	4	246	.02	.02
September	3	0	0	0	.00	.00
October	55	0	9	553	.04	.05
November	750	11	57	3,392	.27	.30
December	145	25	54	3,320	.25	.29
The year	2,860	0	147	104,213	.68	9.10

NACIMIENTO CREEK.

This stream drains the eastern slopes of the Santa Lucia Mountains and enters Salinas River 5 miles above Bradley, Cal. A gaging station was established on this stream at Harris ranch, near Bryson, Cal., by S. G. Bennett, on February 17, 1901. The record on this stream was discontinued April 30, 1901. The total area drained above the gaging station is 171 square miles.

Discharge measurements of Nacimiento Creek, a branch of Salinas River, at point near Bryson, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Feb. 17	S. G. Bennett	6.15	284
Mar. 25	W. W. Cockins, jr	5.3	105
Apr. 3	do	5.3	121

Discharge measurements of Nacimiento Creek, a branch of Salinas River, near Newhall Ranch house, San Migulito ranch, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Jan. 18	S. G. Bennett	6.1	106
Feb. 13	do	6.5	169
June 3	H. Hamlin	4.82	33
July 12	do	4.42	3.8

Estimated monthly discharge of Nacimiento Creek, a tributary of Salinas River, at Bryson, Monterey County.

[Drainage area, 171 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
	Sec.-feet.	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
February 17 to 28	3,300	295	855	20,350	5.00	5.21
March	365	110	184	11,314	1.08	1.24
April	670	87	99	5,891	.58	.65

Discharge measurements of Nacimiento Creek, a tributary of Salinas River, 4 miles above mouth, San Luis Obispo County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Feb. 15	S. G. Bennett		527

BURNETT CREEK.

Discharge measurements of Burnett Creek, tributary of Nacimiento Creek, a branch of Salinas River, San Luis Obispo County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Apr. 4	W. W. Cockins, jr		21

SAN ANTONIO CREEK.

This stream drains the eastern slopes of the Santa Lucia Mountains and enters the Salinas River at Bradley, Cal. A gaging station was established near Jolon, Cal., December 15, 1900, by W. W. Cockins, jr. The total area drained is 161 square miles. The record on this stream was discontinued April 30, 1901.

Discharge measurements of San Antonio Creek, Salinas River, near Jolon, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Jan. 19	S. G. Bennett	4.45	185
Feb. 12	do	4.8	242
Mar. 18	W. W. Cockins, jr	4.5	148
Mar. 26	do	4.3	76
Apr. 5	do	4.3	76
Apr. 18	do	4.1	59
July 11	H. Hamlin		.64

Discharge measurement of San Antonio Creek, Salinas River, Los Ojitos Dam site, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Apr. 17	J. B. Lippincott		50

Discharge measurement of San Antonio Creek, Salinas River, Pinkerton Dam site, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Apr. 17	J. B. Lippincott		37

Estimated monthly discharge of San Antonio Creek, a tributary of Salinas River, at Jolon, Monterey County.

[Drainage area, 161 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1900.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
December 15 to 28	200	170	184	5,109	1.14	0.59
1901.						
January	3,700	64	523	32,158	3.25	3.75
February	1,700	110	509	28,268	3.17	3.31
March	400	84	171	10,514	1.06	1.22
April	740	39	83	4,939	.52	.58

SAN LORENZO CREEK.

This stream drains the western slopes of the Gavilan Mountains and enters the Salinas River near Kings City, Cal. There is a reservoir and dam site on the stream 5 miles above its mouth. The stream is entirely dry during the summer months. The flood waters are used for winter irrigation. A gaging station was established December 16, 1900, by W. W. Cockins, jr., at Hollenbeck's ranch, a quarter of a mile below the dam site.

The area of the watershed drained is 235 square miles.

Discharge measurements of San Lorenzo Creek, Salinas River, at dam site, 5 miles above King City, Monterey County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
1901.		*Feet.*	*Sec.-feet.*	
Jan. 22	S. G. Bennett	4.98	28.7	Near Hollenbeck ranch house.
Feb. 14	do	5.3	71.2	Do.
Mar. 27	W. W. Cockins, jr	4.3	12.6	Do.
Apr. 1	do	4.2	5.1	Do.
Apr. 15	do	4.1	2.1	Do.
Nov. 2	H. E. Green	.9	2.8	Near Mathews ranch house.
1902.				
Jan. 24	S. G. Bennett	.9	4.6	Do.
Feb. 24	do	1.09	43.0	Do.
Apr. 30	do	.9	1.8	Do.
July 16	Homer Hamlin	.08		Do.

Estimated monthly discharge of San Lorenzo Creek, a tributary of Salinas River, at King City, Monterey County.

[Drainage area, 235 square miles.]

Month.	Discharge.			Total. discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1900.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
December 16 to 31	13	9	9	286	0.04	0.02
1901.						
January	2,540	9	171	10,514	.73	.84
February	9,200	9	725	40,264	3.09	3.21
March	27	9	17	1,045	.07	.08
April	13	6	8	476	.03	.03

Estimated monthly discharge of San Lorenzo Creek at King City.

[Drainage area, 235 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1902.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	15	5	6	369	.03	.03
February	795	5	69	3,832	.29	.30
March	875	5	81	4,980	.34	.39
April	5	3	4	238	.02	.02
November	200	15	85	5,057	.36	.40
December	15	5	7	430	.03	.03

SALT SPRING VALLEY.

Estimated seasonal discharge into Salt Spring Valley reservoir near Milton, Calaveras County, Cal.[a]

[Drainage area, 25 square miles.]

Year.	Mean discharge.	Total for year.	Run-off.		Rainfall.	Run-off.
			Per square mile.	Depth.		
	Sec.-feet.	*Acre-feet.*	*Sec.-feet.*	*Inches.*	*Inches.*	*Per cent.*
1889–90	36.7	26,606	1.47	19.95	30.38	65
1890–91	6.3	4,591	.25	3.39	13.06	26
1891–92	4.9	3,560	.20	2.71	16.98	16
1892–93	30.8	22,311	1.23	16.69	26.46	63
1893–94	22.5	16,323	.90	12.21	25.37	48
1894–95	35.4	25,664	1.42	19.27	32.31	59
1895–96	8.5	6,221	.34	4.61	23.98	19
Mean	20.7	15,099	.83	11.26	24.08	42

[a] Evaporation not considered in this table.

SAN ANTONIO CREEK.

The discharge of the streams of southern California was unusually low in September, 1898, and these measurements were made by the Edison Electric Company to determine the minimum with its hourly fluctuation.

Discharge measurements of San Antonio Creek, at Water Company's weir, San Bernardino County.

[Measurements by Edison Electric Co.]

Date.	Discharge.	Date.	Discharge.
September 15, 1898:	*Sec.-feet.*	September 15, 1898—Cont'd.	*Sec.-feet.*
7 a. m	5.60	9 p. m	5.44
7.30 a. m	5.60	9.30 p. m	5.60
8 a. m	5.60	10 p. m	5.60
8.30 a. m	5.60	10.30 p. m	5.60
9 a. m	5.58	11 p. m	5.60
9.30 a. m	5.58	11.30 p. m	5.70
10 a. m	5.58	12 midnight	5.70
10.30 a. m	5.44	September 16, 1898:	
11 a. m	5.32	12.30 a. m	5.70
11.30 a. m	5.32	1 a. m	5.70
12 m	5.32	1.30 a. m	5.70
12.30 p. m	5.32	2 a. m	5.70
1 p. m	5.06	2.30 a. m	5.70
1.30 p. m	5.06	3 a. m	5.70
2 p. m	5.06	3.30 a. m	5.70
2.30 p. m	5.06	4 a. m	5.70
3 p. m	4.94	4.30 a. m	5.70
3.30 p. m	4.94	5 a. m	5.70
4 p. m	4.94	5.30 a. m	5.70
4.30 p. m	4.80	6 a. m	5.60
5 p. m	4.80	6.30 a. m	5.60
5.30 p. m	4.80	12-hour mean	5.57
6 p. m	4.92		
6.30 p. m	5.06	September 16, 1898:	
12-hour mean	5.22	7 a. m	5.60
		7.30 a. m	5.60
September 15, 1898:		8 a. m	5.60
7 p. m	5.06	8.30 a. m	5.60
7.30 p. m	5.06	9 a. m	5.60
8 p. m	5.06	9.30 a. m	5.60
8.30 p. m	5.44	10 a. m	5.44

Discharge measurements of San Antonio Creek, etc.—Continued.

Date.	Discharge.
September 16, 1898—Cont'd.	*Sec.-feet.*
10.30 a. m	5.20
11 a. m	5.18
11.30 a. m	5.06
12 m	5.06
12.30 p. m	4.94
1 p. m	4.94
1.30 p. m	5.06
2 p. m	5.06
2.30 p. m	5.06
3 p. m	5.06
3.30 p. m	4.80
4 p. m	4.80
4.30 p. m	4.56
5 p. m	5.06
5.30 p. m	5.06
6 p. m	5.06
6.30 p. m	4.92
12-hour mean	5.16
September 16, 1898:	
7 p. m	5.06
7.30 p. m	5.06
8 p. m	5.06
8.30 p. m	5.06
9 p. m	5.44
9.30 p. m	5.44
10 p. m	5.44
10.30 p. m	5.60
11 p. m	5.60
11.30 p. m	5.60
12 midnight	5.60
September 17, 1898:	
12.30 a. m	5.60
1 a. m	5.60
1.30 a. m	5.60
2 a. m	5.60
2.30 a. m	5.60
3 a. m	5.60
3.30 a. m	5.70
4 a. m	5.70
4.30 a. m	5.70
5 a. m	5.70
5.30 a. m	5.70
6 a. m	5.70
6.30 a. m	5.60
12-hour mean	5.52

Discharge measurements of San Antonio Creek, San Bernardino County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
July 23, 1896	J. H. Quinton	7.9	Mouth of canyon.
July 2, 1898	F. H. Olmsted	6.59	Do.
Aug. 26, 1898	do	5.18	Division weir.
Aug. 25, 1899	S. G. Bennett	4.48	Mouth of canyon.
July 11, 1900	do	4.07	Do.
Sept. 25, 1900	W. W. Cockins, jr.	3.72	Division weir.
April 3, 1902	S. G. Bennett	11.40	Do.
July 23, 1896	J. H. Quinton	1.88	Ontario water from tunnel.
July 2, 1898	F. H. Olmsted	3.36	In creek at Pierce's camp.

The water of San Antonio Creek is utilized to a large extent. The Pacific Electric Light and Power Company, commonly called the San Gabriel Electric Company, has a power plant in the canyon at an elevation of 3,250 feet. The water from the tailrace of this power house passes over a measuring weir and is discharged into the pipe line of the San Antonio Water Company's power plant. It is carried in this conduit on the right bank of the canyon to a point opposite the old division weir between the San Antonio Water Company and the Pomona Land and Water Company, from which point it is discharged through the power house of the San Antonio Water Company. The portion of the water which goes to the San Antonio Water Company is again diverted through a pipe line and used at a third power house, at an elevation of about 1,900 feet, near the left bank of the canyon. In addition there is a tunnel in the mouth of the canyon run through the bowlders and gravels of the river bed to bed rock, up to and near the old division box mentioned above. This tunnel water together with all other water after it has been used for power is used for irrigation near Ontario and Pomona.

The second power plant on the river was constructed by the San Antonio Water Company during the year 1902, and before the water was diverted into the conduits of this corporation a board of engineers was appointed by the San Antonio Water Company to make measurements of the water in various portions of the canyon in order to determine what effect, if any, would result from the diversion of the stream which they contemplated from the upper power house of the San Gabriel Electric Company to the old division box. This board of engineers consisted of W. H. Saunders, chief engineer, F. E. Trask, Samuel Storrow, and J. B. Lippincott, consulting engineer. Suitable weirs were erected, and automatic river-height-recording devices were installed on most of these weirs. The San Gabriel Electric Company's power-house weir was located in the tailrace of the power house, and measured the main volume of water in the river at that point. The "Fountain of Life" spring is a small steady flow of water issuing from a spring near the San Gabriel Electric Company's power house, but the water is not included in that measured in the power-house weir. A small amount of water was flowing in the bed of the stream opposite the San Gabriel Electric Company's power house, and was not included in either the power-house weir or the "Fountain of Life" spring measurements.

The Spring Hill weir was located in the main river below the San Gabriel Electric Company's power house and measured total flow.

The "Baby Ruth" weir was also in the main stream below the San Gabriel Electric Company's power house, and above the division weir, and measured the full stream.

The division weir was located in the main stream opposite the power house of the San Antonio Water Company. At this point the

water is divided between the San Antonio Water Company and the Pomona Land and Water Company, but before the division occurs a certain amount of water, known as gird water, is taken out of the stream and not included in the measurement of the main division weir.

The water measured in the San Antonio tunnel is picked up from the sands and gravels of the river bed below all the above-mentioned points of measurements, and this water is not included in any other measurement.

All these measurements were made prior to the time when the diversion occurred through the new pipe line and power plant of the San Antonio Water Company.

All these measurements were made for the San Antonio Water Company by the engineers in question. They were supplemented by further continuous records obtained from the automatic registers; but these records are not now available for publication.

Discharge measurements of San Antonio Creek.

Date.	Hydrogapher.	Discharge.	Locality.
1902.		*Sec.-feet.*	
June 28	J. B. Lippincott	7.69	Baby Ruth weir.
July 12, 11.40 a. m	do	6.88	Do.
July 12, 1.13 p. m	do	6.58	Do.
Aug. 2, 11.15 a. m	do	6.15	Do.
Aug. 9, 11 a. m	do	6.15	Do.
Aug. 9, 1.12 p. m	do	5.99	Do.
Aug. 29, 11.45 a. m	do	5.61	Do.
Sept. 29, 12.30 p. m	do	4.88	Do.
Oct. 18, 12.30 p. m	do	4.74	Do.
June 28	do	6.56	Division weir.
Do	do	.42	Gird water.
		6.98	Total.
July 12, 10.58 a. m	do	5.76	Division weir.
Do	do	.35	Gird water.
		6.11	Total.
July 12, 2.40 p. m	do	5.20	Division weir.
Do	do	.35	Gird water.
		5.55	Total.

Discharge measurements of San Antonio Creek—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1902.		*Sec.-feet.*	
Aug. 2, 10.30 a. m	J. B. Lippincott	4.83	Division weir.
Do	do	.36	Gird water.
		5.19	Total.
Aug. 2, 2.30 p. m	do	4.35	Division weir.
Do	do	.36	Gird water.
		4.71	Total.
Aug. 9, 10.18 a. m	do	4.76	Division weir.
Do	do	.35	Gird water.
		5.11	Total.
Aug. 9, 2.40 p m	do	4.18	Division weir.
Do	do	.35	Gird water.
		4.53	Total.
Aug 29, 10.55 a. m	do	4.26	Division weir.
Do	do	.38	Gird water.
		4.64	Total.
Aug. 29, 2.27 p. m	do	3.55	Division weir.
Do	do	.38	Gird water.
		3.93	Total.
Sept. 27, 10.30 a. m	do	4.00	Division weir.
Do	do	.33	Gird water.
		4.33	Total.
Sept. 27, 2.15 p. m	do	3.57	Division weir.
Do	do	.33	Gird water.
		3.90	Total.
Oct. 18, 10.55 a. m	do	3.98	Division weir.
Do	do	.38	Gird water.
		4.36	Total.
June 28	do	.34	Fountain of Life spring—weir measurement.
July 12, 12.15 p. m	do	.34	Do.
Aug. 2, 12.05 p. m	do	.30	Do.

Discharge measurements of San Antonio Creek—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1902.		*Sec.-feet.*	
Aug. 9, 11.42 a. m	J. B. Lippincott	0.32	Fountain of Life spring—weir measurement.
Aug. 29, 12.20 p. m	do	.29	Do.
Sept. 27, 11.33 a. m	do	.29	Do.
Oct. 18, 12 m	do	.30	Do.
June 28	do	1.38	San Antonio tunnel—weir measurement.
July 12, 10.36 a. m	do	1.27	Do.
Aug. 2, 10.10 a. m	do	1.19	Do.
Aug. 9, 10 a. m	do	1.17	Do.
Aug. 30, 10.30 a. m	do	1.15	Do.
Sept. 27, 10.12 a. m	do	1.12	Do.
June 28	do	7.40	San Gabriel Electric Company's power house—concrete weir basin—weir measurement.
July 12, 12.20 p. m	do	6.10	Do.
Aug. 2, 12 m	do	5.59	Do.
Aug. 9, 11.48 a. m	do	5.67	Do.
Aug. 29, 12.30 p. m	do	4.59	Do.
Sept. 27, 11.37 a. m	do	4.64	Do.
Oct. 13, 11.38 a. m	do	4.31	Do.
June 28	do	.55	San Gabriel Electric Company's power house—weir measurement in creek.
July 12, 12.33 p. m	do	.47	Do.
Aug. 2, 12.10 p. m	do	.40	Do.
Aug. 9, 12.11 p. m	do	.40	Do.
Aug. 29, 12.40 p. m	do	.35	Do.
Sept. 27, 12 m	do	.36	Do.
Oct. 18, 12 m	do	.39	Do.
Aug. 2, 11.45 a. m	do	6.31	Spring Hill weir.
Aug. 9, 11.22 a. m	do	6.36	Do.
Aug. 9, 1 p. m	do	5.88	Do.
Aug. 29, 12.07 p. m	do	5.59	Do.
Aug. 29, 12.10 p. m	do	5.40	Do.
Sept. 27, 12.05 p. m	do	5.28	Do.
Oct. 18, 12.12 p. m	do	5.01	Do.

SAN BERNARDINO VALLEY.

Discharge measurements of San Bernardino Valley, between San Bernardino and Riverside.

Date.	Discharge.	Locality.
	Sec.-feet.	
June, 1898	0.61	Developed water, Camp Carlton ditch.
September, 1898	1.20	Do.
March, 1899	2.13	Do.
June, 1899	1.63	Do.
August, 1899	1.02	Do.
March, 1900	2.55	Do.
June, 1900	2.60	Do.
September, 1900	1.67	Do.
October 7, 1902	1.70	Do.
June, 1898	.67	Beams ditch, natural water.
September, 1898	.65	Do.
March, 1899	.72	Do.
June, 1899	.52	Do.
August, 1899	.40	Do.
March, 1900	.68	Do.
June, 1900	.50	Do.
September, 1900	.33	Do.
October 13, 1902	.22	Do.
June, 1898	5.26	Bloomington flume, developed water.
September, 1898	5.49	Do.
March, 1899	.00	Do.
June, 1899	5.93	Do.
August, 1899	3.05	Do.
March, 1900	3.80	Do.
June, 1900	3.68	Do.
September, 1900	3.28	Do.
October 7, 1902	2.28	Do.
June, 1898	6.82	City of Colton ditch, developed water.
September, 1898	7.40	Do.
March, 1899	3.20	Do.
June, 1899	5.49	Do.
August, 1899	3.89	Do.
March, 1900	4.94	Do.
June, 1900	3.21	Do.
September, 1900	3.54	Do.
October 7, 1902	3.53	Do.
June, 1898	1.97	Colton Terrace Water Co., developed water.
September, 1898	1.61	Do.

Discharge measurements of San Bernardino Valley, etc.—Continued.

Date.	Discharge.	Locality.
	Sec.-feet.	
March, 1899	1.69	Colton Terrace Water Co., developed water.
June, 1899	1.30	Do.
August, 1899	1.30	Do.
March, 1900	1.69	Do.
June, 1900	1.54	Do.
September, 1900	1.53	Do.
October 7, 1902	1.08	Do.
June, 1898	.63	Daley ditch, natural water.
September, 1898	.67	Do.
March, 1899	.71	Do.
June, 1899	.51	Do.
August, 1899	.51	Do.
March, 1900	.72	Do.
June, 1900	1.12	Do.
September, 1900	.54	Do.
October 13, 1902	.00	Do.
June, 1898	4.40	East Riverside district, or Riverside Highlands Water Co., developed water.
September, 1898	4.43	Do.
March, 1899	4.25	Do.
June, 1899	2.08	Do.
August, 1899	2.00	Do.
March, 1900	6.59	Do.
June, 1900	5.38	Do.
September, 1900	3.70	Do.
June, 1898	1.16	Gage canal, Santa Ana River, natural water.
September, 1898	1.16	Do.
March, 1899	.72	Do.
June, 1899	.24	Do.
August, 1899	.64	Do.
March, 1900	.395	Do.
June, 1900	.29	Do.
September, 1900	.17	Do.
October 7, 1902	.00	Do.
June, 1898	26.26	Gage canal, Palm avenue weir, developed water.
September, 1898	25.07	Do.
March, 1899	26.68	Do.
June, 1899	25.22	Do.
August, 1899	23.47	Do.
March, 1900	21.96	Do.
June, 1900	22.23	Do.

Discharge measurements of San Bernardino Valley, etc.—Continued.

Date.	Discharge	Locality.
	Sec.-feet.	
September, 1900	27.85	Gage canal, Palm avenue weir, developed water.
October 11, 1902	30.17	Do.
June, 1898	.84	Haws and Talmadge ditch, natural water.
September, 1898	.00	Do.
March, 1899	.28	Do.
June, 1899	.00	Do.
August, 1899	.00	Do.
March, 1900	.00	Do.
June, 1900	.00	Do.
September, 1900	.00	Do.
September 30, 1902	.00	Do.
June, 1898	.72	Logsdon and Farrell ditch, natural water.
September, 1898	.63	Do.
March, 1899	1.61	Do.
June, 1899	1.15	Do.
August, 1899	.54	Do.
March, 1900	1.26	Do.
June, 1900	.49	Do.
September, 1900	.20	Do.
October 13, 1902	.00	Do.
June, 1898	.37	McIntyre ditch, natural water.
September, 1898	.038	Do.
March, 1899	.82	Do.
June, 1899	.15	Do.
August, 1899	.00	Do.
March, 1900	.14	Do.
June, 1900	.01	Do.
September, 1900	.00	Do.
October 7, 1902	.00	Do.
June, 1898	2.54	McKenzie ditch, natural water.
September, 1898	2.08	Do.
March, 1899	9.40	Do.
June, 1899	3.86	Do.
August, 1899	2.00	Do.
March, 1900	2.30	Do.
June, 1900	1.57	Do.
September, 1900	1.69	Do.
September 30, 1902	.00	Do.
June, 1898	8.42	Meeks and Daley ditch, natural water.
September, 1898	17.00	Do.

Discharge measurements of San Bernardino Valley, etc.—Continued.

Date.	Discharge.	Locality.
	Sec. feet.	
March, 1899	17.00	Meeks and Daley ditch, natural water.
June, 1899	15.48	Do.
August, 1899	10.45	Do.
March, 1900	13.94	Do.
June, 1900	13.78	Do.
September, 1900	14.68	Do.
September 30, 1902	13.40	Do.
June, 1898	1.94	Mill pump, developed water.
September, 1898	2.04	Do.
March, 1899	.00	Not running.
June, 1899	1.77	Mill pump, developed water.
August, 1899	1.67	Do.
March, 1900	.00	Not running.
June, 1900	1.88	Mill pump, developed water.
September, 1900	1.52	Do.
September 30, 1902	1.20	Do.
June, 1898	5.37	Rabel dam ditch, natural water.
September, 1898	3.07	Do.
March, 1899	2.26	Do.
June, 1899	1.54	Do.
August, 1899	.94	Do.
March, 1900	.54	Do.
June, 1900	.35	Do.
September, 1900	.07	Do.
September 30, 1902	.00	Do.
June, 1898	1.75	Ranchero ditch, natural water.
September, 1898	1.64	Do.
March, 1899	1.64	Do.
June, 1899	1.00	Do.
August, 1899	.41	Do.
March, 1900	.24	Do.
June, 1900	.55	Do.
September, 1900	1.33	Do.
Do	.80	Ranchero ditch, developed water.
June, 1898	3.12	Riverside Water Company, natural water.
September, 1898	3.36	Do.
March, 1899	5.30	Do.
June, 1899	7.29	Do.
August, 1899	2.56	Do.
March, 1900	2.67	Do.

Discharge measurements of San Bernardino Valley, etc.—Continued.

Date.	Discharge.	Locality.
	Sec.-feet.	
June, 1900	2.17	Riverside Water Company, natural water.
September, 1900	.94	Do.
September 30, 1902	.50	Do.
June, 1898	2.30	Shay or Stout dam ditch, natural water.
September, 1898	2.08	Do.
March, 1899	2.23	Do.
June, 1899	1.13	Do.
August, 1899	.90	Do.
March, 1900	.507	Do.
June, 1900	.40	Do.
September, 1900	.16	Do.
September 30, 1902	.00	Do.
June, 1898	1.00	Swamp ditch, natural water.
September, 1898	1.02	Do.
March, 1899	.85	Do.
June, 1899	.77	Do.
August, 1899	.69	Do.
March, 1900	.70	Do.
June, 1900	.89	Do.
September, 1900	.86	Do.
October 14, 1902	.93	Do.
June, 1898	1.60	Ward and Warren ditch, developed water.
Do	.72	Ward and Warren ditch, natural water.
September, 1898	1.60	Ward and Warren ditch, developed water.
Do	.72	Ward and Warren ditch, natural water.
March, 1899	1.60	Ward and Warren ditch, developed water.
Do	1.49	Ward and Warren ditch, natural water.
June, 1899	.615	Ward and Warren ditch, developed water.
August, 1899	1.56	Do.
March, 1900	1.60	Do.
Do	.95	Ward and Warren ditch, natural water.
June, 1900	1.60	Ward and Warren ditch, developed water.
Do	.10	Ward and Warren ditch, natural water.
September, 1900	.53	Ward and Warren ditch, developed water.
October 14, 1902	.30	Do.
Do	1.58	Ward and Warren ditch, natural water.
June, 1898	.26	Whiting ditch, natural water.
September, 1898	.01	Do.
March, 1899	.76	Do.
June, 1899	.246	Do.

Discharge measurements of San Bernardino Valley, etc.—Continued.

Date.	Discharge.	Locality.
	Sec.-feet.	
August, 1899	0.01	Whiting ditch, natural water.
March, 1900	1.12	Do.
June, 1900	.13	Do.
September, 1900	.00	Do.
October 13, 1902	.00	Do.
June, 1898	.34	Whitlock ditch, natural water.
September, 1898	.38	Do.
March, 1899	.47	Do.
June, 1899	.28	Do.
August, 1899	.09	Do.
March, 1900	.23	Do.
June, 1900	.00	Do.
September, 1900	.00	Do.
October 13, 1902	.00	Do.

List of discharge measurements of San Bernardino Valley between San Bernardino and Colton.

Date.	Discharge.	Remarks.
	Sec.-feet.	
June, 1898	18.00	Riverside Water Co., upper canal, developed water.
Do	41.04	Riverside Water Co., upper canal, natural water.
September, 1898	17.54	Riverside Water Co., upper canal, developed water.
Do	43.80	Riverside Water Co., upper canal, natural water.
March, 1899	18.04	Riverside Water Co., upper canal, developed water.
Do	42.49	Riverside Water Co., upper canal, natural water.
June, 1899	17.50	Riverside Water Co., upper canal, developed water.
Do	36.42	Riverside Water Co., upper canal, natural water.
August, 1899	27.50	Riverside Water Co., upper canal, developed water.
Do	24.54	Riverside Water Co., upper canal, natural water.
March, 1900	24.54	Riverside Water Co., upper canal, developed water.
Do	37.40	Riverside Water Co., upper canal, natural water.
June, 1900	32.36	Riverside Water Co., upper canal, developed water.
Do	20.58	Riverside Water Co., upper canal, natural water.
September, 1900	27.00	Riverside Water Co., upper canal, developed water.
Do	34.02	Riverside Water Co., upper canal, natural water.
September 30, 1902	26.08	Riverside Water Co., upper canal, developed water.
Do	21.89	Riverside Water Co., upper canal, natural water.

Discharge measurements of return waters below Slover Mountain, above Riverside Narrows, San Bernardino Valley, between San Bernardino and Riverside.

Date.	Discharge.	Remarks.
1902.	*Sec.-feet.*	
September 29	5.94	West Riverside pumping plant, developed water.
October 11	4.38	Rogers pumping plant, developed water.
Do	2.95	Riverside Water Co., pumping plant No. 1, Santa Ana River flume, developed water.
Do	2.08	Riverside Water Co., pumping plant No. 2, Santa Ana River flume, developed water.
September 29	3.07	Riverside Water Co., flume head of lower canal, natural water.
Do	7.19	Roubidoux Canal, natural water.
Do	2.17	Evans ditch at north line Riverside County line, natural water.
Do	.53	Evans ditch 1 mile south Riverside County line, natural water.
Do	5.35	Evans Island ditch, west end of West Riverside bridge, natural water.
Do	1.96	Alvetriz ditch at east end West Riverside bridge, natural water.
October 10	43.25	Santa Ana River at Riverside Narrows.
Total	63.52	

Comparative amounts of water, in second-feet, flowing in canals above Colton.

Name of ditch.	June, 1898.	Sept., 1898.	Mar., 1899.	June, 1899.	Aug., 1899.	Mar., 1900.	June, 1900.	Sept., 1900.	Sept., 1902.
Haws & Talmage	0.84	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00
Rabel dam	5.37	3.07	2.36	1.54	.94	.54	.35	.07	.00
Shay or Stout dam	2.30	2.08	2.23	1.13	.90	.507	.40	.16	.00
McKenzie	2.54	2.08	9.40	3.86	2.00	2.30	1.57	1.69	.00
Meeks & Daley	8.42	[a]17.00	17.00	15.48	10.45	13.94	13.78	14.68	13.40
Beam	.67	[b].65	.72	.52	.40	.68	.50	.33	.22
Riverside Water Co., upper canal [b]	59.04	61.34	60.53	53.92	52.04	61.94	52.94	61.02	47.97
Timber	.00	.00	.00	.00	.00	.00	.00	.00	.00
Gage canal, Santa Ana River	1.16	1.16	.72	.24	.64	.395	.29	.17	.00
Gage canal, Palm avenue	[c]26.26	[c]25.07	[c]26.68	[c]25.22	[c]23.47	[c]21.96	[c]22.23	[c]27.85	[c]30.17
Logsdon & Farrell	.72	.63	1.61	1.15	.54	1.26	.49	.20	.00
Whitlock	.34	.38	.47	.28	.094	.23	.00	.00	.00
Daley	.63	.67	.71	.51	.51	.72	1.12	.54	.00
McIntyre	.37	.038	.82	.15	.00	.14	.01	.00	.00
Whiting	.26	.01	.76	.246	.01	1.12	.13	.00	.00
Swamp	1.00	1.02	.85	.77	.69	.70	.89	.86	.93
Ranchero	[a]1.75	1.64	1.64	1.00	.41	.24	.55	1.33	2.28
Ward & Warren	2.32	[a]2.32	3.09	.615	1.56	2.55	1.70	.53	1.88
Mill flume of Riverside Water Co	3.12	3.36	5.30	7.29	2.56	2.67	2.17	.94	.50
Mill pump of Riverside Water Co	1.94	2.04	[d]	1.77	1.67	[d]	1.88	1.52	1.20
Camp Carlton	.61	1.20	2.13	1.62	1.02	2.55	2.60	1.67	1.70
East Riverside	4.40	4.43	4.25	2.08	2.00	6.59	5.38	3.70	------
Colton Terrace Water Co	1.97	1.61	1.69	1.30	1.30	1.69	1.54	1.53	1.08
City of Colton	6.82	7.40	3.20	5.49	3.89	4.94	3.21	3.54	3.53
Bloomington flume	5.26	5.49	[d]	5.93	3.05	3.80	3.68	3.28	.00
West Riverside 350-inch pumping plant	------	------	------	------	------	------	------	------	5.94
Rogers pumping plant	------	------	------	------	------	------	------	------	4.38
Santa Ana River flume; Riverside pumping plants Nos. 1 and 2	------	------	------	------	------	------	------	------	5.03
Total	138.11	144.69	146.44	132.11	110.14	131.46	117.41	125.61	120.21

[a] Interpolated. [b] Above Slover Mountain. [c] River water not included. [d] Pumps not run.

Return water, natural flow in second-feet, compared with developed water in San Bernardino Valley above Colton.

Name of ditch.	June, 1898.		September, 1898.		March, 1899.		June, 1899.	
	Developed.	Natural.	Developed.	Natural.	Developed.	Natural.	Developed.	Natural.
Haws & Talmage		0.84		0.00		0.28		0.00
Rabel dam		5.37		3.07		2.36		1.54
Shay or Stout dam		2.30		2.08		2.23		1.13
McKenzie		2.54		2.08		9.40		3.86
Beam		.67		.65		.72		.52
Riverside Water Co., upper canal	18.00	41.04	17.54	43.80	18.04	42.49	17.50	36.42
Gage canal, Santa Ana River		1.16		1.16		.72		.24
Gage canal, Palm avenue weir	26.26		25.07		26.68		25.22	
Logsdon & Farrell		.72		.63		1.61		1.15
Whitlock		.34		.38		.47		.28
Daley		.63		.67		.71		.51
McIntyre		.37		.038		.82		.15
Whiting		.26		.010		.76		.246
Swamp		1.00		1.020		.85		.77
Ranchero		[a]1.75		1.640		1.64		1.00
Ward & Warren	1.60	.72	1.60	.720	1.60	1.49	.615	
Mill flume of Riverside Water Co		3.12		3.360		5.30		7.29
Mill pump of Riverside Water Co	1.94		2.04		Not run.		1.77	
Camp Carlton ditch	.61		1.20		2.13		1.62	
East Riverside district, or Riverside Highland Water Co	4.40		4.43		4.25		2.08	
Colton Terrace Water Co	1.97		1.61		1.69		1.30	
City of Colton pumping plant	6.82		7.40		3.20		5.49	
Bloomington flume	5.26		5.49		.00		5.93	
Meeks & Daley ditch		8.42		[a]17.00		17.00		15.48
Total	66.86	71.25	66.38	78.31	57.59	88.85	61.525	70.59

[a] Interpolated.

Return water, natural flow in second-feet, etc.—Continued.

Name of ditch.	August, 1899.		March, 1900.		June, 1900.		September, 1900.		September, 1902.	
	Developed.	Natural.	Developed.	Natural.	Developed.	Natural.	Developed.	Natural.	Developed.	Natural.
Haws & Talmage		0.00		0.000	0.00	0.00		0.00		0.00
Rabel dam		.94		.540		.35		.07		.00
Shay or Stout dam		.90		.507		.40		.16		.00
McKenzie		2.00		2.300		1.57		1.69		.00
Beam		.40		.680		.50		.33		.22
Riverside Water Co., upper canal	27.50	24.54	24.54	37.40	32.36	20.58	27.00	34.02	26.08	21.89
Gage canal, Santa Ana River		.64		.395		.29		.17		.00
Gage canal, Palm avenue weir	23.47		21.96		22.23		27.85		30.17	
Logsdon & Farrell		.54		1.26		.49		.20		.00
Whitlock		.09		.23		.00		.00		.00
Daley		.51		.72		1.12		.54		.00
McIntyre		.00		.14		.01		.00		.00
Whiting		.01		1.12		.13		.00		.00
Swamp		.69		.70		.89		.86		.93
Ranchero		.41		.24		.55	.80	.53	2.28	
Ward & Warren	1.56		1.60	.95	1.60	.10	.53		.30	1.58
Mill flume of Riverside Water Co		2.56		2.67		2.17		.94		.50
Mill pump of Riverside Water Co	1.67			Not run.	1.88		1.52		1.20	
Camp Carlton ditch	1.02		2.55		2.60		1.67		1.70	
East Riverside district, or Riverside Highland Water Co	2.00		6.59		5.38		3.70			
Colton Terrace Water Co	1.30		1.69		1.54		1.53		1.08	
City of Colton pumping plant	3.89		4.94		3.21		3.54		3.53	
Bloomington flume	3.05		3.80		3.68		3.28		.00	
Meeks & Daley ditch		10.45		13.94		13.78		14.68		13.40
West Riverside 350-inch pumping plant									5.94	
Rogers pumping plant									4.38	
Santa Ana River flume; Riverside pumping plant Nos. 1 and 2									5.03	
Total	65.46	44.68	67.67	63.79	74.48	42.93	71.42	54.18	81.69	38.52

From the two preceding tables it will be noted that despite severe droughts which existed from 1898 to 1902, inclusive, the output of water from the gravel beds above Colton has but slightly diminished, the total being 144.69 second-feet in September, 1898, as compared with 120.21 second-feet in September, 1902. The amount of developed water in September, 1898, was 66.38 second-feet, and in September, 1902, 81.69 second-feet, while the natural return water between the same dates decreased from 78.31 second-feet to 38.52 second-feet. During this period much development work was done, and while these new supplies do not mean an absolute addition to the output from the district, the fact that the total supply was maintained notwithstanding the drought is a decided achievement.

SAN DIEMAS WASH.

See San Gabriel River, miscellaneous measurements, San Diemas Wash.

SAN FERNANDO CREEK.

Discharge measurement of San Fernando Creek, tributary of Los Angeles River, at San Fernando Mission, Los Angeles County.

Date.	Hydrographer.	Discharge.
1901.		*Sec.-feet.*
Jan. 28	J. B. Lippincott	3.21

SAN FRANCISQUITO CREEK.

Discharge measurement of San Francisquito Creek at junction with Santa Clara River, Los Angeles County.

Date.	Hydrographer.	Discharge.
1898.		*Sec.-feet.*
Aug. 11	F. H. Olmsted	2.07

SAN GABRIEL RIVER.

The drainage basin of this river lies on the southern slope of the Sierra Madre, the watershed being included in Los Angeles County, Cal. The various tributaries join the river before it enters its lowest canyon, whence it appears finally on the plain in the vicinity of Azusa. The seepage waters appear lower down in the valley. The floods discharge into the Pacific Ocean through a number of poorly defined storm channels. All the summer flow of this stream is now used for irrigation purposes in the vicinity of Azusa. Owing to the numerous diversions, it has been difficult to obtain accurate discharge measurements, but during 1898 the San Gabriel Electric Company completed its system, and measurements are now obtained with greater ease, and hence with greater accuracy. The head works of this company are located about 6 miles above the mouth of the canyon, the water is carried along the left side by a series of tunnels and

conduits, and a head of 400 feet is obtained where the electric power is generated. Weirs are placed on the conduit of the electric company, and the low water is measured at this point. The capacity of the conduit is 90 second-feet. The gaging station on the main river is located at the mouth of the canyon. The equipment consists of a rod, a cable, a car, and a tagged wire.

Discharge measurements of San Gabriel River at point near mouth of canyon near Azusa, Los Angeles County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1895.		*Feet.*	*Sec.-feet.*	
Sept. 10	J. B. Lippincott	1.19	34.93	Total flow, meter measurement.
Nov. 5	do		13.25	Total flow.
Dec. 11	do		0.00	River.
Do	do		37.50	Canals.
Dec. 21	do	1.9	27.30	River.
Do	do		26.60	Canals.
	Total		53.90	
Dec. 21	J. B. Lippincott		27.05	River.
Do	do		26.60	Canals.
	Total		53.65	
1896.				
Feb. 17	J. B. Lippincott	1.35	4.86	River.
Do	do		33.00	Canals.
	Total		37.86	
Mar. 22	J. B. Lippincott	2.27	69.91	River.
Do	do		35.20	Canals.
	Total		105.11	
Apr. 30	J. B. Lippincott		0.00	River.
Do	do		55.20	Canals.
June 17	do		25.14	Irrigators upper weir.
Do	do		19.94	River.
Do	do		3.99	Azusa irrigation development.
Do	do		1.54	Vineland tunnel.
	Total		25.47	
July 22	John H. Quinton		0.00	River.
Do	do		26.75	Canals.
Nov. 22	J. B. Lippincott		0.00	
Do	do		21.10	Canals.

Discharge measurements of San Gabriel River, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1897.		*Feet.*	*Sec.-feet.*	
Jan. 10	J. B. Lippincott	1.28	4.50	River.
Do	do		19.93	Canals.
Do	do		1.65	Vineland canal water.
	Total		26.08	
Jan. 25	J. B. Lippincott	2.00	57.79	River.
Do	do		16.20	Canals.
Do	do		1.13	Vineland canal water.
	Total		75.12	
Feb. 1	J. B. Lippincott	5.1	1,725.0	River.
Do	do		00.0	Canals.
Feb. 2	do	3.4	422.1	River.
Do	do		00.0	Canals.
Mar. 12	do	3.3	410.1	River.
Do	do		18.0	Canals.
	Total		428.1	
Apr. 29	J. B. Lippincott	2.6	162.30	River.
Do	do		71.27	Canals.
	Total		233.57	
May 24	J. B. Lippincott	2.08	76.00	River.
Do	do		67.90	Canals.
	Total		143.90	
June 30	A. Q. Campbell		0.00	River.
Do	do		55.68	Canals.
July 5	do		0.00	River.
Do	do		53.94	Canals.
Aug. 7	do		0.00	River.
Do	do	2.33	31.37	Canals.
Sept. 1	do		0.00	River.
Do	do	2.2	24.25	Canals.
Sept. 29	do		0.00	River.
Do	do	2.1	19.28	Canals.
Nov. 13	do		7.56	River.
Do	do		24.16	Canals.
	Total		31.72	

Discharge measurements of San Gabriel River, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1897.		*Feet.*	*Sec.-feet.*	
Nov. 27	J. B. Lippincott		3.50	River.
Do	do		32.89	Canals.
	Total		36.39	
Nov. 28	J. B. Lippincott		42.11	At San Gabriel Power Company's intake; total flow.
1898.				
Jan. 12	do	1.36	23.29	River.
Do	do		25.00	Canals.
	Total		48.29	
Mar. 8	H. F. Crowe		12.3	Duarte canal.
Do	do		36.9	Azusa canal.
	Total river		49.2	
Apr. 2	J. B. Lippincott		11.30	Duarte canal.
Do	do		29.92	Azusa canal.
	Total river		41.22	
May 10	J. B. Lippincott		0	River.
Do	do		23.34	Canals.
May 17	do	1.03	15.40	River.
Do	do		44.61	Canals.
	Total		60.01	
July 1	F. H. Olmsted		3.59	Duarte canal.
Do	do		11.78	Azusa canal at Slaughterhouse tunnel.
	Total river		15.37	
July 21	J. B. Lippincott		0	River.
Do	do		13.21	San Gabriel Power Company's canal headworks.
Aug. 16	do		0	Power Co.'s headworks; 3 p. m.
Do	do		6.20	Canals; 3 p. m.
Do	do		5.78	Canals; 4 p. m.
Do	do		5.60	Canals; 5 p. m.
Do	do		5.60	Canals; 6 p. m.
Do	do		5.78	Canals; 7 p. m.
Aug. 21	do		5.78	Canals; 8 p. m.

Discharge measurements of San Gabriel River, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1898.		*Feet.*	*Sec.-feet.*	
Aug. 22	J. B. Lippincott		0.00	River; 8 p. m.
Do	do		6.20	Canals; 8 p. m.
Aug. 23	do		0	River; 10 a. m
Do	do		8.48	Daily maximum; 10 a. m.
1899.				
Jan. 11	do	1.16	15.9	River.
Do	do		5.0	Waste.
Do	do		28.3	Canals.
	Total		49.2	
Jan. 16 to 19.	H. F. Parkinson		18.00	River and canals.
Aug. 26	do		5.5	Canals; no water in river.
1900.				
Nov. 21	S. G. Bennett		0	River; 11 a. m.
Do	do		20.15	Waste.
Do	do		26.13	Canal.
	Total		46.28	
1901.				
Jan. 7	S. G. Bennett	6.16	2,709.0	River (calculated).
Do	do		0	Canals.
Feb. 4	do	2.30	112.0	River.
Do	do		65.0	Canals.
	Total		177.0	
Feb. 5	S. G. Bennett	7.6	6,253.0	River (calculated).
Do	do		0	Canals.
Feb. 22	do	4.1	700.4	River.
Do	do		65.0	Canals.
	Total		765.4	
Mar. 5	S. G. Bennett	3.00	248.0	River.
Do	do		65.0	Canals.
	Total		313.0	

Discharge measurements of San Gabriel River, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1901.		*Feet.*	*Sec.-feet.*	
Mar. 29	S. G. Bennett	2.25	96.5	River.
Do	do		33.0	Canal.
	Total		129.5	
July 11	S. G. Bennett		0	River.
Do	do		31.6	Canal.
1902.				
Jan. 25	W. B. Clapp		0	River.
Do	do		50.94	Canals.
Feb. 26	J. B. Lippincott	2.05	126.19	River.
Do	do		64.00	Canal.
	Total		190.19	
Mar. 6	J. Ahern	1.57	46.2	River.
Do	do		62.0	Canals.
	Total		108.2	
Apr. 8	S. G. Bennett	1.4	26.0	River.
Do	do		44.6	Canals.
	Total		70.6	
June 12	S. G. Bennett		0	River.
Do	do		25.7	Canals.
Sept. 1	W. B. Clapp		5.0	Total flow.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
June 17, 1896	J. B. Lippincott	3.99	Azusa Irrigators Development Tunnel.
Aug. 24, 1898	do	.22	Same place; river being diverted through power company's conduit.
Do	do	.30	Irrigators Development Tunnel, pumped; additional.

Discharge measurements of San Gabriel River, Azusa, Los Angeles County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
June 17, 1896	J. B. Lippincott	1.54	Mouth of Vineland tunnel.
Do	do	2.11	Same; pump running.
Apr. 29, 1897	do	2.23	Mouth of Vineland tunnel.
Do	do	2.11	Same; shaft No. 2.
Do	do	2.13	Same; at head of flume, between shafts Nos. 3 and 4.
Do	do	1.07	Same; right fork, above shaft No. 4.
May 24, 1897	do	1.88	Mouth of Vineland Tunnel.

Discharge measurements of San Gabriel River at intake of San Gabriel Power Company, Los Angeles County.

[Measurements by Edison Electric Company. The flow was unusually small in September, 1898, and these measurements were made to determine this minimum and its hourly fluctuation.]

Date.	Discharge.	Date.	Discharge.
September 15, 1898:	*Sec.-feet.*	September 15, 1898—Cont'd.	*Sec.-feet.*
7 a. m	8.16	6 p. m	6.94
7.30 a. m	8.28	6.30 p. m	6.94
8 a. m	8.40	12-hour mean	7.99
8.30 a. m	8.50		
9 a. m	8.72	September 15, 1898:	
9.30 a. m	8.84	7 p. m	6.94
10 a. m	8.84	7.30 p. m	6.94
10.30 a. m	8.84	8 p. m	6.94
11 a. m	8.84	8.30 p. m	6.94
11.30 a. m	8.72	9 p. m	7.04
12 m	8.62	9.30 p. m	7.04
12.30 p. m	8.40	10 p. m	7.04
1 p. m	8.28	10.30 p. m	7.04
1.30 p. m	8.06	11 p. m	7.04
2 p. m	7.84	11.30 p. m	7.04
2.30 p. m	7.62	12 midnight	7.04
3 p. m	7.50	September 16, 1898:	
3.30 p. m	7.40	12.30 a. m	7.04
4 p. m	7.18	1 a. m	7.04
4.30 p. m	7.04	1.30 a. m	7.18
5 p. m	6.94	2 a. m	7.18
5.30 p. m	6.94	2.30 a. m	7.28

Discharge measurements of San Gabriel River, etc.—Continued.

Date.	Discharge.
September 16, 1898—Cont'd.	*Sec.-feet.*
3 a. m	7.40
3.30 a. m	7.50
4 a. m	7.62
4.30 a. m	7.72
5 a. m	7.84
5.30 a. m	7.96
6 a. m	8.06
6.30 a. m	8.06
12-hour mean	7.29
September 16, 1898:	
7 a. m	8.28
7.30 a. m	8.40
8 a. m	8.28
8.30 a. m	8.50
9 a. m	8.72
9.30 a. m	8.94
10 a. m	9.06
10.30 a. m	9.06
11 a. m	8.94
11.30 a. m	8.84
12 m	8.72
12.30 p. m	8.50
1 p. m	8.28
1.30 p. m	8.06
2 p. m	7.84
2.30 p. m	7.62
3 p. m	7.50
3.30 p. m	7.40
4 p. m	7.18
4.30 p. m	7.04
5 p. m	6.94

Date	Discharge.
September 16, 1898—Cont'd.	*Sec.-feet.*
5.30 p. m	6.82
6 p. m	6.82
6.30 p. m	6.82
12-hour mean	8.02
September 16, 1898:	
7 p. m	6.72
7.30 p. m	6.60
8 p. m	6.60
8.30 p. m	6.60
9 p. m	6.60
9.30 p. m	6.60
10 p. m	6.50
10.30 p. m	6.50
11 p. m	6.60
11.30 p. m	6.60
12 midnight	6.72
September 17, 1898:	
12.30 a. m	6.82
1 a. m	6.82
1.30 a. m	6.82
2 a. m	6.94
2.30 a. m	7.04
3 a. m	7.04
3.30 a. m	7.04
4 a. m	7.00
4.30 a. m	6.92
5 a. m	7.40
5.30 a. m	7.50
6 a. m	7.62
6.30 a. m	7.72
12-hour mean	6.89

The following table is prepared from measurements made three times daily for the San Gabriel Electric Company, and filed in a suit before the United States land office at Los Angeles, Cal. The mean of the three daily measurements is here given.

Estimated daily discharge, in second-feet, of San Gabriel River over weir on West Branch of North Fork, at Sycamore Flat, for 1900.

[Observer, San Gabriel Power Company.]

Day.	July.	August.	September.	October.
1	----------	0.23	0.19	0.20
2	0.28	.23	.19	.12
3	.27	.23	.17	.18
4	.27	.26	.22	.18
5	.26	.17	.12	.23
6	.28	.23	.12	.23
7	.24	.23	.22	.19
8	.23	.22	.18	.19
9	.25	.12	.20	.19
10	.23	.12	.22	.19
11	.25	.19	.22	.19
12	.25	.19	.22	.19
13	.22	.19	.22	.22
14	.27	.19	.18	----------
15	.27	.15	.18	----------
16	.31	.26	.12	----------
17	.31	.23	.12	----------
18	.27	.23	.25	----------
19	.31	.23	.15	----------
20	.39	.22	.12	----------
21	.39	.22	.15	----------
22	.24	.22	.12	----------
23	.26	.22	.15	----------
24	.26	.22	.22	----------
25	.28	.22	.27	----------
26	.37	.23	.26	----------
27	.37	.18	.26	----------
28	.26	.18	.22	----------
29	.23	.25	.20	----------
30	.23	.20	.17	----------
31	.23	----------	----------	----------
Total	.28	.21	.19	.19

Estimated daily discharge, in second-feet, of San Gabriel River over weir on North Branch of North Fork, at Sycamore Flat, for 1900.

[Observer, San Gabriel Power Company.]

Day.	July.	August.	September.	October.
1	----------	0.89	0.62	0.65
2	0.92	.89	.62	.72
3	.92	.89	.62	.68
4	.92	.95	.62	.68
5	.89	.95	.60	.68
6	.89	.74	.65	.68
7	.89	.74	.61	.56
8	.82	.74	.61	.56
9	.80	.77	.83	.56
10	.70	.77	.61	.57
11	.81	.74	.61	.59
12	.83	.74	.63	.59
13	.86	.77	.61	.59
14	.95	.68	.63	----------
15	.97	.74	.63	----------
16	.97	.62	.59	----------
17	.97	.65	.59	----------
18	.97	.65	.59	----------
19	.97	.62	.59	----------
20	.97	.60	.59	----------
21	.97	.60	.53	----------
22	.96	----------	.53	----------
23	1.07	.55	.53	----------
24	.95	.52	.81	----------
25	.95	.52	.68	----------
26	.96	.56	.65	----------
27	.68	.57	.65	----------
28	.68	.57	.68	----------
29	.89	.57	.68	----------
30	.86	.74	.68	----------
31	.68	----------	----------	----------
Total	.89	.70	.63	.62

Estimated daily discharge, in second-feet, of San Gabriel River over weir on West Fork above mouth of North Fork for 1900.

[Observer, San Gabriel Power Company.]

Day.	July.	August.	September.	October.
1	0.55	0.05	0.12	0.16
2	.62	.02	.12	.16
3	.68		.12	.16
4	.62		.12	.16
5	.53		.08	.15
6	.55		.11	.20
7	.55		.16	.20
8	.55		.12	.16
9	.44		.12	.16
10	.34		.16	.13
11	.29		.16	.20
12	.26	.08	.12	.20
13	.24	.07	.12	.20
14	.20	.08	.16	
15	.13	.08	.16	
16	.12	.12	.16	
17	.16	.10	.16	
18	.16	.12	.11	
19	.12	.10	.12	
20	.12	.12	.12	
21	.07	.12	.16	
22	.12	.10	.16	
23		.07		
24		.08		
25	.08	.08	.12	
26			.20	
27		.08	.16	
28	.05	.08	.16	
29	.08	.10	.13	
30	.05	.12	.14	
31	.05	.10		
Total	.29	.09	.14	.17

Estimated daily discharge, in second-feet, of San Gabriel River over weir on Coldwater Creek, 2½ miles above mouth, for 1900.

[Observer, San Gabriel Power Company.]

Day.	July.	August.	September.	October.
1		0.43	0.52	
2			.58	0.60
3		.49	.62	.62
4		.46	.57	.61
5		.54	.55	.63
6		.53	.56	.61
7		.50	.51	.58
8		.50	.51	.58
9		.53	.56	.58
10		.53	.50	.55
11		.53	.55	.60
12		.51	.52	.60
13		.43		.64
14		.47		
15		.45		
16		.45		
17		.47		
18		.47		
19		.52		
20		.55		
21		.56		
22		.51		
23		.49		
24		.45		
25		.44		
26		.45		
27	0.37	.42		
28	.49	.42		
29	.50	.41		
30	.47	.40		
31	.46	.56		
Total	.46	.48	.55	.60

Estimated daily discharge, in second-feet, of San Gabriel River over weir 100 yards above Fish Fork, for 1900.

[Observer, San Gabriel Power Company.]

Day.	July.	August.	September.	October.
1	2.24			1.67
2	2.48			1.67
3	2.48	1.72		1.71
4	2.42	1.80		1.84
5	2.33	1.80		1.84
6	2.27	1.80		1.80
7	2.06	1.80		1.72
8	2.12	1.80		1.67
9	2.09	1.80	1.84	1.71
10	2.15	1.80	1.80	1.71
11	2.09	1.80	1.72	1.75
12	2.15	1.97	1.76	1.76
13	2.15	1.92	1.72	1.89
14	2.03	1.85	1.76	
15	2.03	1.80	1.76	
16	2.12	1.68	1.80	
17	2.00	1.76	1.71	
18	2.00	1.68	1.72	
19	1.97	1.68	1.72	
20	1.97	1.64	1.68	
21	2.00	1.68	1.59	
22	2.00	1.68	1.63	
23	2.00	1.68	1.79	
24	1.97	1.68	1.89	
25	2.18	1.76	1.84	
26	2.00	1.68	1.84	
27	2.00	1.60	1.67	
28	1.95	1.60	1.63	
29	1.77	1.68	1.67	
30	1.77	1.68	1.79	
31		1.97		
Total	2.09	1.75	1.74	1.75

Estimated daily discharge, in second-feet, of San Gabriel River over weir on Fish Fork, 100 yards from mouth, for 1900.

[Observer, San Gabriel Power Company.]

Day.	July.	August.	September.	October.
1	1.42			0.95
2	1.66			.90
3	1.68	0.99		.95
4	1.66	.96		.96
5	1.28	1.02		.93
6	1.25	1.06		.93
7	1.16	1.06		.93
8	1.18	.92		.93
9	1.08	.95	1.52	.90
10	.98	1.02	.92	.89
11	.96	.99	.96	.95
12	.98	1.11	1.13	.95
13	.98	1.11	1.10	1.01
14	1.04	1.02	.99	
15	1.02	.99	1.08	
16	1.25	.90	.94	
17	.93	.90	.93	
18	1.00	.84	.89	
19	1.00	.84	.86	
20	1.00	.95	.84	
21	1.12	.89	.84	
22	1.12	.90	.80	
23	1.13	.90	.98	
24	1.06	.90	1.02	
25	1.02	.92	1.01	
26	.90	.92	.98	
27	.90	.92	.78	
28	.90	.92	.80	
29	.87	.99	.81	
30	.87	.95	.84	
31		1.08		
Total	1.11	.96	.96	.94

Estimated daily discharge, in second-feet, of San Gabriel River over weir on Iron Fork, 100 yards from mouth, for 1900.

[Observer, San Gabriel Power Company.]

Day.	July.	August.	September.	October.
1	1.97			1.05
2	1.97	0.87		1.08
3	2.03	1.05		1.05
4	2.09	1.09		1.12
5	1.89	1.16		1.20
6	1.91	1.16		1.12
7	1.83	.62		1.09
8	1.66	1.16		1.16
9	1.55	1.12	1.09	1.12
10	1.58	1.16	1.12	1.09
11	1.50	1.24	1.12	1.20
12	1.39	1.06	1.09	1.20
13	1.42	1.09	1.09	1.23
14	1.42	1.20	1.12	1.31
15	1.44	1.24	1.16	
16	1.42	1.12	1.09	
17	1.42	1.12	1.16	
18	1.37	1.09	1.09	
19	1.37	1.09	1.09	
20	1.42	1.16	1.05	
21	1.31	1.12	.91	
22	1.34	1.12	.87	
23	1.37	1.02	1.12	
24	1.24	1.02	1.27	
25	1.29	.95	1.20	
26	1.24	.95	1.20	
27	1.26	.95	1.05	
28	1.21	1.02	1.01	
29	1.09	1.09	1.01	
30	1.14	1.09	1.16	
31	1.24	1.12		
Total	1.50	1.07	1.09	1.14

Discharge measurements of San Gabriel River at point above Iron Fork.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
November, 1896	F. C. Finkle	7.7
December, 1896	do	7.4
January, 1897	do	28.4
February, 1897	do	42.0
March, 1897	do	52.1
April, 1897	do	27.9
May, 1897	do	24.7
June, 1897	do	25.4
July, 1897	do	17.8
August, 1897	do	16.4
September, 1897	do	16.5
April, 1900	J. B. Lippincott et al	5.76

Discharge measurements of Iron Fork of San Gabriel River at mouth.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
November, 1896	F. C. Finkle	5.6
December, 1896	do	3.0
January, 1897	do	10.1
February, 1897	do	18.3
March, 1897	do	18.9
April, 1897	do	10.2
May, 1897	do	8.9
June, 1897	do	7.7
July, 1897	do	8.6
August, 1897	do	3.9
September, 1897	do	4.1
April, 1900	J. B. Lippincott et al	1.69

Discharge measurements of North Fork of San Gabriel River.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
November, 1896	F. C. Finkle	3.7
December, 1896	do	3.6
January, 1897	do	10.8
February, 1897	do	17.0
March, 1897	do	19.4
April, 1897	do	13.8
May, 1897	do	11.2
June, 1897	do	7.1
July, 1897	do	5.9
August, 1897	do	4.1
September, 1897	do	3.9
April, 1900	J. B. Lippincott et al	1.43

Discharge measurements of Coldwater Creek, San Gabriel River, Los Angeles County, Cal.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
November, 1896	F. C. Fincle	4.1
December, 1896	do	4.2
January, 1897	do	11.3
February, 1897	do	19.1
March, 1897	do	17.8
April, 1897	do	11.3
May, 1897	do	9.8
June, 1897	do	8.3
July, 1897	do	6.5
August, 1897	do	5.1
September, 1897	do	5.0
April, 1900	J. B. Lippincott et al	1.46

Discharge measurements of Bear Creek, San Gabriel River, Los Angeles County, Cal.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
November, 1896	F. C. Fincle	3.3
December, 1896	do	3.4
January, 1897	do	9.1
February, 1897	do	24.7
March, 1897	do	23.9
April, 1897	do	17.3
May, 1897	do	14.1

Discharge measurements of Bear Creek, San Gabriel River, at point near mouth, Los Angeles County, Cal.

Date	Hydrographer.	Discharge.
		Sec.-feet.
June, 1897	F. C. Fincle	6.3
July, 1897	do	6.2
August, 1897	do	4.4
September, 1897	do	4.5
April, 1900	J. B. Lippincott et al	2.42

Discharge measurement of West Fork of San Gabriel River above Bear Creek, Los Angeles County, Cal.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
April, 1900	J. B. Lippincott et al	1.80

Discharge measurement of West Fork of San Gabriel above junction with East Fork, or Main River, Los Angeles County, Cal.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
August 23, 1898	J. B. Lippincott	2.67

Discharge measurement of East Fork of San Gabriel above junction with West Fork, Los Angeles County, Cal.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
August 23, 1898	J. B. Lippincott	7.11

Discharge measurement of San Gabriel River at junction of East and West forks.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
August 23, 1898	J. B. Lippincott	9.78
Do	do	[a] 8.42
Loss		1.36

[a] San Gabriel River at headworks of San Gabriel Power Company.

Discharge measurement of Cattle Canyon above Coldwater, San Gabriel River, Los Angeles County, Cal.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
April, 1900	J. B. Lippincott et al	0.32

Discharge measurements of San Gabriel River at various points in watershed below El Monte Narrows.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
July 3, 1898	F. H. Olmsted	2.52	Whittier ditch, El Monte road crossing.
Do	do	9.06	Temple ditch, left of Narrows flume.
Do	do	8.79	Baldwin ranch house road.
Do	do	6.18	Original river channel.
Do	do	3.36	Campers station.
Do	do	1.22	Puente ditch; 50 per cent of usual head in ditch.
Do	do	29.79	Old mission bridge (Rio Hondo).
	Total	60.92	

Discharge measurements of San Gabriel River at various points in watershed.

Date.	Hydrographer.	Locality.	Area of section.	Mean velocity.	Discharge.
1897.			*Sq. feet.*	*Ft. per sec.*	*Sec.-feet.*
Dec. 5	J. B. Lippincott	San Gabriel River, Los Angeles and Whittier road bridge.			106
1900.					
Aug. 7	S. G. Bennett	East Whittier ditch at El Monte road crossing.	4.08	1.4	5.71
Aug. 7	do	Killion's pumping plant, 4 wells near El Monte.	5.76	1.774	10.22
Aug. 7	do	Cameron or Sheep Creek ditch.	9.62	.25	2.46
Aug. 7	do	Rincon ditch	1.99	1.24	2.47
Aug. 7	do	Old Temple ditch	1.22	.98	1.20
Aug. 7	do	Cate ditch, near head	9.47	.92	8.71
Aug. 7	do	Standifer ditch	9.34	1.557	14.56
Aug. 7	do	Banta ditch	11.45	1.349	15.44
		Total, San Gabriel River at intake of Standifer and Banta ditches.			30.00
Aug. 8	do	Rodriguez ditch, near Old Mission.	1.20	1.67	2.00
Aug. 8	do	Rio Honda or Old San Gabriel, under Mission bridge.	31.42	.74	23.28
Aug. 8	do	Arroyo ditch	11.90	1.83	21.08
Aug. 8	do	Little Lake	.60	.37	.22
Aug. 8		[a] Agricultural ditch			Dry.
Sept. 17	W. W. Cockins	Bradbury ranch, Santa Anita, and Rose avenues.			1.44
Sept. 17	do	San Gabriel Sanitarium tunnel.			.04
Sept. 18	do	W. A. Highland, Rose avenue, Lamanda Park.			.10
Sept. 19	do	Chapman ranch, 2 wells pumped; 1 artesian well.			1.01
Sept. 19	do	Chapman ranch, 4 wells pumped.			1.90
Sept. 20	do	Chapman ranch, natural flow of ciénaga.			.07
Sept. 20	do	Chapman ranch dairy	.52	1.38	.72
		Chapman ranch, total			3.70

[a] San Gabriel River dry below this point.

Discharge measurements of San Gabriel River, etc.—Continued.

Date.	Hydrographer.	Locality.	Area of section.	Mean velocity.	Discharge.
1900.			*Sq. feet.*	*Ft. per sec.*	*Sec.-feet.*
Sept. 20	W. W. Cockins	Alhambra Water Co., weir No. 1.			2.58
Sept. 20	do	Alhambra Water Co., weir No. 2.			.34
		Total			2.92
Sept. 24	do	Santa Anita Canyon, natural flow.			.22
Sept. 24	do	Sierra Madre Water Co. (weir).			.145
Sept. 24	do	Remamettes east of Sierra Madre.	0.12	0.75	.09
Sept. 18	do	Monrovia Water Co., 3 wells pumped.			3.24
Sept. 24	do	Monrovia Canyon, to Monrovia Water Co. (weirs).			.428
		To Bradbury			.116
		Total			.544
Sept. 21	do	Duarte Mutual Improvement and Canal Co.			.78
Sept. 21	do	Beardsley Water Co			.44
Sept. 13	do	Morengo Water Co. Southern Pacific Co.'s Garfield station (weir).			1.82
Sept. 13	do	Morengo Water Co.'s weir in Morengo Canyon (weir).			.46
Sept. 13	do	Los Robles Water Co.'s reservoir (weir).			.31
Sept. 13	do	Reservoir at junction of Glenarm and Los Robles avenues, Pasadena (weir).			.068
Sept. 13	do	Graves & Bean tunnel	2.06	5.34	1.10
Sept. 14	do	Brick kiln between Molino and Hope streets, Pasadena.			.02
Sept. 14	do	Oak Knoll Park, Pasadena.	.096	3.53	.34
Sept. 14	do	Patton tunnel, near Kewen Lake.	.047	3.80	.18
Sept. 14	do	Patton's east canyon	.87	1.70	1.48
Sept. 17	do	Patton's east canyon, natural flow; pump not running.	.36	1.03	.37

Discharge measurements of San Gabriel River, etc.—Continued.

Date.	Hydrographer.	Locality.	Area of section.	Mean velocity.	Discharge.
1900.			*Sq. feet.*	*Ft. per sec.*	*Sec.-feet.*
Sept. 17	W. W. Cockins	Mission ditch, Patton ranch.			0.20
Sept. 14	do	Winston ranch	0.60	0.93	.56
Sept. 14	do	Shorbes ranch (weir)			.18
Sept. 15	do	Yoakham's ranch (weir).			.12
Sept. 15	do	Robert Liddel, San Pasqual and Shorb (weir).			.10
Sept. 15	do	R. W. Scoville (weir)			.07
Sept. 15	do	Mrs. Black, San Pasqual and Craig streets (weir).			.07
Sept. 15	do	Morningside ranch (weir).			.04
Sept. 27	do	Glendora, Azusa Irrigation Co.:			
		Massey well			1.50
		Paine well			.90
		Total			2.40
Sept. 27	Irwin F. Daniels	Wells in San Diemas wash:			
Sept. 27	do	Daty & Sons			1.80
Sept. 27	do	San Diemas Irrigation Co., F. D. Smith well			1.20
Sept. 27	do	Thacker well			.80
Sept. 27	do	Smith well (private).			.30
Sept. 27	do	Chapman well			.70
Sept. 27	do	Ruddock well			.50
Sept. 27	do	Artesian Belt Co., 2 wells.			1.60
Sept. 27	do	Azusa city well			.20
Sept. 27	do	Walker's well			.90
Sept. 27	do	Citizens' Water Co. (Covina).			.10
Sept. 27	do	Covina plant, Deacon well.			.44
Sept. 27	do	Natural flow, San Diemas Canyon.			.04
Sept. 27	do	Spark's well			.40
		Total			11.38

Discharge measurements of San Gabriel River at wells on Lordsburg Mesa.

Date.	Hydrographer.	Locality.	Area of section.	Mean velocity.	Discharge.
			Sq. feet.	*Ft. pr. sec.*	*Sec.-feet.*
Sept. 27	Irwin F. Daniels	Richards, 4 wells			1.52
Sept. 27	do	Sumner			.48
Sept. 27	do	Sheldon Bros			.30
Sept. 27	do	La Verne Land and Water Co.			.70
Sept. 27	do	Rodgers			.10
Sept. 27	do	True (5 days in 30)			.16
Sept. 27	do	Rodney Soper			.24
Sept. 27	do	Hayes & Stratton			.20
Sept. 27	do	Wallace			.16
Sept. 27	do	Mullard			.30
Sept. 27	do	Douglas & McQuilly			.76
Sept. 27	do	Norris			.30
Sept. 27	do	Williams Bros			.80
Sept. 27	do	Kulp (intermittent), south of Mesa avenue.			.20
Sept. 27	do	D. Fulton			.50
Sept. 27	do	Steves			.20
Sept. 27	do	Daniels & Overholtzer			1.34
Sept. 27	do	Massey, 2 wells			.54
Sept. 27	do	Hauser Bros			.76
Sept. 27	do	Moorwaw & Son			.50
Sept. 27	do	Sleider			.88
Sept. 27	do	Rutherford & Co			.40
Sept. 27	do	New Deal Water Co			.40
Sept. 27	do	Kiser			.90
		Total			12.64

Estimated monthly discharge of San Gabriel River at Azusa, Los Angeles County.

[Drainage area, 222 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1894.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
May	50	27	32	1,968	0.14	0.16
June	27	17	23	1,369	.10	.11
July	17	9	12	738	.05	.06
August	27	10	14	861	.06	.07
September	23	13	15	893	.07	.08
October	16	13	14	861	.06	.07
November 1 to 15	14	13	13	387	.06	.03
1895.						
August 8 to 31	47	38	42	1,999	.19	.17
September	39	29	32	1,904	.14	.16
October	32	27	29	1,783	.13	.15
November	50	29	40	2,380	.18	.20
December	45	37	42	2,582	.19	.22
1896.						
January	25	0	11	676	0.05	0.06
February	28	3	12	690	.05	.06
March	134	27	75	4,612	.34	.39
April	46	0	11	655	.05	.06
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	177	0	12	738	.05	.06
November	16	0	3	179	.01	.01
December	12	0	2	123	.01	.01
The year	177	0	11	7,673	.05	.65

Note.—During the summer months all this water is diverted by the canals. For 1894 and 1895 the above table is for the total discharge from the drainage basin. Subsequent to 1895 the table shows the separate flow in river and canals, except where combined and so stated.

Estimated monthly discharge of San Gabriel River at Azusa, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1897.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	130	5	40	2,484	0.181	0.201
February	1,710	46	332	18,420	1.494	1.555
March	1,765	275	448	27,572	2.020	2.329
April	345	141	259	15,417	1.166	1.301
May	141	28	82	5,042	.369	.420
June	28	.2	5	274	.021	.024
July	0	0	0	0	0	.000
August	0	0	0	0	0	.000
September	0	0	0	0	0	.000
October	1,600	0	72	4,458	.322	.372
November	15	.4	8	475	.036	.040
December	5	3.0	4	221	.016	.018
The year	1,765	0	104	74,302	.469	6.260
1898.						
January	31	0	14	863	0.06	0.07
February	41	0	11	622	.05	.05
March	1	0	0.03	2	0	0
April	0	0	0	0	0	0
May	63	0	4.5	277	.02	.02
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	0	0	0	0	0	0
The year	63	0	2.5	1,764	.01	.14

Estimated monthly discharge of San Gabriel River at Azusa, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	16	0	1.2	74	0.005	0.005
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	0	0	0	0	0	0
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	13	0	.42	26	0.002	.002
November	0	0	0	0	0	0
December	0	0	0	0	0	0
The year	16	0	.13	100	.007	.007
1900.						
January	49	0	2	123	0.01	0.01
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	0	0	0	0	0	0
May	38	0	2	123	.01	.01
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	5,168	0	172	10,235	0.77	0.85
December	0	0	0	0	0	0
The year	5,168	0	15	10,481	.07	.87

Estimated monthly discharge of San Gabriel River at Azusa, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,450	0	111	6,825	0.50	0.58
February	2,600	70	613	34,044	2.76	2.87
March	370	80	158	9,715	.71	.82
April	75	13	43	2,559	.19	.21
May	200	18	55	3,382	.25	.29
June	27	0	7	417	.03	.03
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	70	0	3	184	.01	.01
November	0	0	0	0	0	0
December	0	0	0	0	0	0
The year	2,600	0	83	57,126	.37	4.81
1902.						
January	0	0	0	0		
February	57	0	3	167		
March	318	4	38	2,337		
April	37	0	7	417		
May	0	0	0	0		
June	0	0	0	0		
July	0	0	0	0		
August	0	0	0	0		
September	0	0	0	0		
October	0	0	0	0		
November	0	0	0	0		
December	0	0	0	0		
The year	318	0	4	2,921		

Estimated monthly discharge of San Gabriel canals at Azusa, Los Angeles County.

[Drainage area, 222 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1896.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	26	26	26	1,599	0.12	0.14
February	34	26	30	1,726	.14	.15
March	43	35	36	2,214	.16	.18
April	45	40	43	2,559	.19	.21
May	42	29	36	2,214	.16	.18
June	27	13	19	1,131	.09	.10
July	15	9	12	738	.05	.06
August	36	9	14	861	.06	.07
September	19	11	13	774	.06	.07
October	17	10	11	676	.05	.06
November	24	15	17	1,012	.08	.09
December	25	18	20	1,230	.09	.10
The year	45	9	23	16,734	.10	1.41
1897.						
January	22	13	17.56	1,072	0.079	0.091
February	20	3	13.10	726	.059	.061
March	21	0	17.14	1,051	.077	.089
April	60	15	35.30	2,102	.159	.177
May	68	55	62.97	3,810	.284	.328
June	71	54	63.20	3,759	.285	.317
July	52	27	38.13	2,343	.171	.197
August	34	22	26.45	1,613	.118	.136
September	23	18	20.66	1,226	.088	.098
October	26	10	18.03	1,106	.081	.093
November	29	16	23.30	1,385	.105	.109
December	29	25	26.84	1,648	.121	.139
The year	71	0	30.20	21,831	.136	1,835

Estimated monthly discharge of San Gabriel canals at Azusa, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1898.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	32	23	26	1,591	0.12	0.14
February	34	10	29	1,618	.13	.14
March	48	28	35	2,129	.16	.18
April	37	25.3	33	1,950	.15	.17
May	45	20.0	32	1,947	.14	.16
June	30	14.5	19	1,159	.09	.10
July	14	9.0	11	672	.05	.06
August	9	5.0	7	456	.03	.03
September	10	6.1	8	467	.04	.04
October	10	7.5	9	533	.04	.04
November	11	8.0	10	580	.04	.04
December	18	11.7	14	832	.06	.07
The year	48	5.0	19.4	13,934	.09	1.17
1899.						
January	33	15	21.8	1,340	0.098	0.115
February	27	20	22.0	1,244	.102	.106
March	40	18	26.0	1,623	.119	.137
April	28	16	21.0	1,262	.096	.107
May	17	12	14.0	842	.062	.071
June	22	5	10.0	565	.043	.048
July	4	3	4.0	221	.016	.018
August	6	4	5.0	295	.022	.025
September	6	3	4.0	220	.019	.021
October	26	4	11.1	683	.050	.058
November	24	10	14.0	847	.064	.071
December	39	16	20.0	1,247	.091	.105
The year	40	3	14.4	10,389	.065	.882

Estimated monthly discharge of San Gabriel canals at Azusa, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1900.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	50	22	30	1,845	0.14	0.16
February	23	18	20	1,111	.09	.09
March	30	16	20	1,230	.09	.10
April	26	13	17	1,012	.08	.09
May	56	16	35	2,152	.16	.18
June	22	8	15	893	.07	.08
July	10	4	6	369	.03	.03
August	5	4	4	246	.02	.02
September	6	3	4	238	.02	.02
October	6	4	5	307	.02	.02
November	55	5	14	833	.06	.07
December 1 to 16	53	31	40	1,269	.18	.11
The year	55	3	18	11,505	.08	.97
1901.						
January	90	0	58	3,566	0.26	0.30
February	70	5	67	3,721	.30	.31
March	70	35	63	3,874	.28	.32
April	84	55	67	3,987	.30	.33
May	72	59	66	4,058	.30	.35
June	66	41	56	3,332	.25	.28
July	41	24	30	1,845	.14	.16
August	27	15	20	1,230	.09	.10
September	20	15	17	1,012	.08	.09
October	64	0	21	1,291	.09	.10
November	50	29	32	1,904	.14	.16
December	30	26	27	1,660	.12	.14
The year	90	0	44	31,480	.20	2.64

Estimated monthly discharge of San Gabriel canals at Azusa, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1902.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	51	24	28	1,722		
February	63	27	34	1,888		
March	62	55	61	3,750		
April	62	46	59	3,510		
May	48	30	39	2,398		
June	29.5	13.5	20	1,190		
July	17	7.5	11	676		
August	8.5	6	7	430		
September	6	4.5	5	298		
October	10.5	5.5	7	430		
November	62	7.5	19	1,131		
December	68	16	32	1,968		
The year	68	4.5	27	19,391		

Estimated monthly discharge of San Gabriel River and canals at Azusa, Los Angeles County.

[Drainage area, 222 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1896.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	51	26	37	2,275	0.17	0.20
February	61	36	41	2,358	.18	.19
March	169	37	111	6,825	.50	.58
April	91	40	54	3,213	.24	.27
May	40	29	36	2,214	.16	.18
June	27	13	19	1,131	.09	.10
July	15	9	12	738	.05	.06
August	36	9	14	861	.06	.07
September	19	11	13	774	.06	.07
October	188	10	24	1,476	.11	.13
November	40	15	19	1,131	.09	.10
December	37	17	22	1,353	.10	.12
The year	188	9	34	24,349	.15	2.07

Estimated monthly discharge of San Gabriel River and canals at Azusa, Los Angeles County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1897.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	147	25	57.9	3,617	0.260	0.292
February	1,713	64	344.8	19,146	1.553	1.579
March	1,765	294	465.6	28,623	2.097	2.418
April	370	201	294.4	17,519	1.325	1.478
May	196	94	145.0	8,851	.653	.748
June	91	54	67.8	4,033	.306	.341
July	52	27	38.1	2,343	.171	.197
August	34	22	26.4	1,613	.118	.136
September	23	18	20.7	1,226	.088	.098
October	1,640	22	90.5	5,564	.403	.465
November	34	31	33.3	1,860	.141	.149
December	34	28	30.5	1,875	.137	.158
The year	1,765	18	134.6	96,270	.604	8.059
1898.						
January	63	28	40	2,453	0.18	0.20
February	70	32	40	2,241	.18	.19
March	48	28	35	2,131	.16	.18
April	37	25.3	33	1,950	.15	.17
May	83	25.0	36	2,223	.16	.19
June	30	14.5	19	1,159	.09	.10
July	14	9.0	11	672	.05	.06
August	9	5.0	7	456	.03	.04
September	10	6.1	8	467	.04	.04
October	10	7.5	9	533	.04	.05
November	11	8.0	10	580	.04	.05
December	18	11.7	14	832	.06	.07
The year	83	5.0	22	15,697	.10	1.34

Estimated monthly discharge of San Gabriel River and canals at Azusa, Los Angeles County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	33	15	23	1,414	0.104	0.120
February	28	20	22	1,244	.102	.106
March	40	18	26	1,623	.119	.137
April	28	16	21	1,262	.096	.107
May	17	12	14	842	.062	.071
June	22	5	10	565	.043	.048
July	4	3	4	221	.016	.018
August	6	4	5	295	.022	.025
September	6	3	4	220	.019	.021
October	26	4	11	709	.050	.058
November	24	10	14	847	.064	.071
December	39	16	20	1,247	.091	.105
The year	40	3	5	10,489	.065	.887
1900.						
January	89	22	32	1,968	0.14	0.16
February	23	18	20	1,111	.09	.09
March	30	16	20	1,230	.09	.10
April	26	13	17	1,012	.08	.09
May	86	16	37	2,275	.17	.20
June	22	8	15	893	.07	.08
July	10	4	6	369	.03	.03
August	5	4	4	246	.02	.02
September	6	3	4	238	.02	.02
October	6	4	5	307	.02	.02
November	5,200	5	186	11,068	.84	.93
December 1 to 16	53	31	40	1,269	.18	.11
The year	5,200	3	32	21,986	.15	1.85

Estimated monthly discharge of San Gabriel River and canals at Azusa, Los Angeles County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,450	28	169	10,391	0.76	0.87
February	2,605	137	680	37,765	3.06	3.19
March	440	135	221	13,589	1.00	1.15
April	130	95	110	6,545	.50	.56
May	272	83	121	7,440	.55	.63
June	93	41	63	3,749	.28	.31
July	41	24	30	1,845	.14	.16
August	27	15	20	1,230	.09	.10
September	20	15	17	1,012	.08	.09
October	122	15	24	1,476	.11	.13
November	50	29	32	1,904	.14	.16
December	30	26	27	1,660	.12	.14
The year	2,605	15	126	88,606	.57	7.49
1902.						
January	51	24	28	1,722	0.13	0.15
February	120	38	37	2,055	.17	.17
March	378	63	99	6,087	.45	.52
April	99	48	66	3,927	.30	.33
May	48	30	39	2,398	.17	.20
June	29.5	13.5	20	1,190	.09	.10
July	17	7.5	11	676	.05	.06
August	8.5	6	7	430	.03	.03
September	6	4.5	5	298	.02	.02
October	10.5	5.5	7	430	.03	.03
November	80	7.5	19	1,131	.09	.10
December	68	16	32	1,968	.14	.16
The year	378	4.5	31	22,312	.14	1.87

SAN GREGORIO CREEK.

Discharge measurement of San Gregorio Creek, San Mateo County.

Date.	Hydrographer.	Discharge.	Locality.
1893.		*Sec. ft.*	
Oct. 17	W. W. Brier	6.49	One-third mile above San Gregorio.

SAN JOAQUIN RIVER.

The headwater tributaries of this river receive the drainage from the crests of the Sierra Nevada north of Mount Whitney. The fall of the river is rapid, with many favorable locations for power development, and in one case advantage has been taken of the fall on the North Fork, and a power plant constructed, developing electric power for transmission to Fresno and Hanford, Cal. During 1899 a second storage reservoir was under course of construction on the North Fork, which will tend further to regulate the flow of the river. No permanent diversions above the gaging station are made, but the water is extensively used below for irrigation purposes. The gage rod at the station was established by the Southern Pacific Railway Company in 1879. The old trestle bridge was torn down by the railroad company during 1899 and a new iron structure was erected in its place. This necessitated a new gage rod, which was set to the datum of the old gage and bolted to the western side of the central concrete pier. The bench mark is a nail in a post at the south end of the bridge on the west side, 0.2 foot above the ground and marked "B. M." It is at an elevation of 24.12 feet above gage datum. The channel for some distance above and below the bridge is straight, and the water has a uniform velocity. The right bank is high, rocky, and steep. The bed of the stream is of sand and gravel.

Discharge measurements of San Joaquin River at Herndon, Fresno County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.
1895.		*Feet.*	*Sec.-feet.*
Jan. 9	A. P. Davis and J. B. Lippincott	4	1,995
Mar. 22	J. B. Lippincott	3.85	1,938
May 5	do	6.65	7,419
June 23	do	8.00	11,225
Aug. 31	do	3.00	677
Oct. 11	do	2.6	332
Nov. 25	do	2.55	270
1896.			
Apr. 13	J. A. Vogleson	4.1	2,406
June 11	J. B. Lippincott	9.33	15,942
Nov. 2	do	2.75	424

Discharge measurements of San Joaquin River at Herndon, etc.—Continued.

Date.	Hydrographer	Gage height.	Discharge.
1897.		*Feet.*	*Sec.-feet.*
Feb. 14	J. B. Lippincott	3.58	1,117
May 31	do	8.60	10,500
July 16	A. Q. Campbell	4.5	3,223
Sept. 8	do	2.66	271
Nov. 2	do	2.92	515
Dec. 21	J. B. Lippincott	3.00	699
1898.			
Apr. 19	J. B. Lippincott	5.42	4,162
May 30	do	4.58	2,235
July 28	do	3	611
Sept. 2	do	2.52	328
Dec. 20	do	2.5	287
1899.			
Mar. 5	J. B. Lippincott	3.25	786
Apr. 18	S. G. Bennett	6.34	5,310
May 13	do	[a]7	7,435
June 2	do	5.76	4,177
June 27	do	4.90	2,922
Aug. 1	do	3.32	743
Sept. 8	do	2.67	196
1900.			
Feb. 2	J. B. Lippincott	3.25	1,003
Apr. 3	S. G. Bennett	4.66	2,641
May 15	do	5.91	4,448
June 18	do	5.67	3,710
Aug. 9	do	2.83	466
Sept. 1	do	2.50	246
Sept. 28	do	2.33	197
Dec. 30	do	3.33	614
1901.			
Jan. 30	S. G. Bennett	4	1,357
Mar. 2	do	6.8	6,179
Apr. 3	do	5	3,357
July 31	do	5.67	3,909
Oct. 16	do	2.25	352
1902.			
May 14	S. G. Bennett	7.35	7,381
Sept. 11	L. M. Lawson	.....	323

[a] Gage height at beginning, 6.75; at ending, 7.25

Discharge measurements of San Joaquin River, Fresno County.

Date.	Hydrographer.	Discharge.	Locality.
1899.		*Sec.-feet.*	
Sept. 8	S. G. Bennett	269	500 feet above Pollasky Bridge.
1900.			
Sept. 28	S. G. Bennett	188	Do.
Sept. 28	J. S. Eastwood	188	
1901.			
Oct. 16	S. G. Bennett	315	At Pollasky Ford.
1900.			
Aug. 31	E. G. Hamilton	31	South Fork at Blaney Meadows.
1902.			
Sept. 27	S. G. Bennett	589	Above railroad bridge near Lathrop, San Joaquin County.
Sept. 6	E. T. Perkins	.7	Granite Creek 100 feet below sheep bridge.
Sept. 7	do	342	150 yards below junction Jackass Creek.
Sept. 7	do	3	Jackass Creek 50 feet above junction with San Joaquin.
Sept. 8	do	148	Middle Fork 100 yards above Miller Bridge.
Sept. 10	do	51	Mono Creek at Trail Crossing.
Sept. 10	do	107	South Fork at Trail Crossing.
Sept. 10	do	9	Big Creek at dam site of J. S. Eastwood.
Sept. 8	L. M. Lawson	309	Pollasky.
Sept. 9	do	18	Canal at Reservoir, North Fork, at San Joaquin power house.
Sept. 10	do	310	San Joaquin Electric Co.'s power house.
Sept. 12	do	25	Below dam at Mendota.
Sept. 12	do	260	Miller and Lux Canal at small dam.
Sept. 12	do	265	Miller and Lux canal at bridge near dredger.

Estimated monthly discharge of San Joaquin River at Hamptonville, Fresno County.

[Drainage area, 1,637 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November	----------	----------	330	19,636	0.20	0.22
December	----------	----------	410	25,210	.25	.29
1879.[a]						
January	3,010	370	609	37,446	0.37	0.43
February	5,420	620	1,276	70,865	.78	.81
March	3,340	1,300	1,953	120,085	1.19	1.37
April	8,560	2,360	3,849	229,031	2.35	2.62
May	10,030	2,850	5,302	326,007	3.24	3.74
June	11,640	4,200	6,379	379,576	3.90	4.35
July	4,460	1,300	2,303	141,606	1.41	1.63
August	1,300	550	786	48,329	.48	.55
September	480	310	381	22,671	.23	.26
October	480	260	373	22,935	.23	.27
November	420	370	411	24,456	.25	.28
December	4,700	700	1,140	70,096	.70	.81
The year	11,640	260	2,063	1,493,103	1.26	17.12
1880.[a]						
January	1,020	770	825	50,727	0.50	0.58
February	2,360	770	942	54,184	.57	.61
March	1,640	1,120	1,229	75,568	.75	.86
April	15,580	1,300	4,846	288,357	2.96	3.30
May	25,000	5,420	13,170	809,792	8.05	9.28
June	25,600	14,180	18,120	1,078,214	11.07	12.35
July	14,650	3,350	8,010	492,516	4.89	5.64
August	4,700	840	1,730	106,374	1.06	1.22
September	840	550	734	43,676	.45	.50
October	480	380	422	25,948	.26	.30
November	450	370	380	22,612	.23	.26
December	6,730	395	2,001	123,037	1.22	1.41
The year	25,600	370	4,367	3,171,005	2.67	36.31

[a] Authority, California State engineering department.

Estimated monthly discharge of San Joaquin River at Hamptonville, Fresno County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	59,800	1,024	3,856	237,096	2.35	2.71
February	22,450	2,440	6,340	352,106	3.87	4.03
March	6,570	2,440	2,855	175,547	1.74	2.01
April	13,250	5,900	8,008	476,509	4.89	5.45
May	16,500	5,900	9,095	559,230	5.56	6.41
June	9,230	4,300	5,948	353,931	3.63	4.05
July	5,180	2,200	3,064	188,398	1.87	2.16
August	1,640	760	1,260	77,474	.77	.89
September	760	490	584	34,750	.36	.40
October	490	430	463	28,469	.28	.32
November	530	380	461	27,431	.28	.31
December	2,740	340	632	38,860	.39	.45
The year	59,800	340	3,547	2,549,801	2.17	29.19
1882.[a]						
January	330	290	303	18,631	0.19	0.22
February	520	280	330	18,327	.20	.21
March	3,890	340	1,522	93,584	.93	1.07
April	7,360	2,540	3,409	202,849	2.08	2.32
May	12,860	7,360	8,850	544,165	5.41	6.23
June	13,980	4,280	7,867	468,119	4.81	5.36
July	6,900	700	2,918	179,421	1.78	2.05
August	1,630	450	591	36,339	.36	.42
September [b]			240	14,281	.15	.17
October [b]			564	34,679	.34	.39
November [b]			490	29,157	.30	.33
December [b]			320	19,676	.20	.23
The year			2,370	1,659,228	1.40	19.00

[a] Authority, California State engineering department.
[b] Estimated from previous measurements and neighboring streams.

Estimated monthly discharge of San Joaquin River at Hamptonville, Fresno County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1883.[a]	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January[b]			320	19,676	0.20	0.23
February[b]			320	17,771	.20	.21
March[b]			1,150	70,711	.70	.81
April[b]			2,130	126,744	1.30	1.45
May[b]			7,370	453,164	4.50	5.19
June[b]			6,220	370,116	3.80	4.24
July[b]			1,470	90,387	.90	1.04
August[b]			490	30,129	.30	.35
September[b]			410	24,397	.25	.28
October[b]			330	20,291	.20	.23
November[b]			250	14,876	.15	.17
December[b]			250	15,372	.15	.17
The year			1,726	1,253,634	1.05	14.37
1884.[a]						
January[b]			410	25,210	0.25	0.29
February[b]			2,460	141,501	1.50	1.62
March[b]			4,090	251,484	2.50	2.88
April[b]			3,270	194,578	2.00	2.23
May[b]			8,190	503,583	5.00	5.76
June[b]			16,400	975,868	10.02	11.18
July[b]			13,100	805,488	8.00	9.22
August[b]			3,270	201,064	2.00	2.31
September[b]			980	58,314	.60	.67
October[b]			820	50,420	.50	.58

[a] Authority, California State engineering department.
[b] Estimated from previous measurements and neighboring streams.

Estimated monthly discharge of San Joaquin River at Herndon, Fresno County.

[Drainage area, 1,637 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	11,225	1,260	2,881	177,146	1.76	2.03
February	8,500	909	2,568	142,619	1.57	1.63
March	9,318	1,554	2,779	170,874	1.70	1.96
April	9,863	3,354	5,834	347,147	3.56	3.97
May	19,960	5,100	13,124	806,963	8.02	9.24
June	14,250	7,250	10,674	635,147	6.52	7.27
July	8,000	2,148	4,528	278,416	2.77	3.20
August	2,301	793	1,417	87,128	.87	1.00
September	8,500	260	1,085	64,562	.66	.73
October	1,260	260	420	25,825	.26	.30
November	426	260	362	21,540	.22	.24
December	677	260	373	22,935	.23	.26
The year	19,960	260	3,837	2,780,302	2.35	31.83
1896.						
January	12,800	250	2,119	130,335	1.29	1.49
February	1,750	950	1,177	67,696	.72	.77
March	12,176	1,180	2,612	160,649	1.60	1.84
April	5,648	1,920	2,675	159,192	1.64	1.83
May	18,800	2,560	5,394	331,700	3.30	3.81
June	16,920	6,544	11,799	702,106	7.21	8.00
July	8,080	1,600	4,177	256,865	2.55	3.04
August	1,300	700	1,048	64,463	.64	.74
September	1,180	80	534	31,817	.33	.37
October	700	80	167	10,275	.10	.12
November	2,390	430	697	41,492	.43	.48
December	1,750	430	666	40,957	.41	.47
The year	18,800	80	2,756	1,997,547	1.69	22.96

Estimated monthly discharge of San Joaquin River at Herndon, Fresno County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1897.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,180	535	655	40,275	0.40	0.46
February	15,660	1,180	2,598	144,286	1.59	1.66
March	4,600	1,675	2,325	142,960	1.42	1.64
April	11,708	2,305	6,541	389,216	4.00	4.46
May	18,600	9,565	13,545	832,855	8.27	9.54
June	12,332	2,390	5,862	348,812	3.57	3.98
July	4,300	1,300	2,493	153,290	1.52	1.75
August	1,300	590	898	55,216	.55	.63
September	535	105	227	13,507	.14	.16
October	820	105	279	17,155	.17	.20
November	4,300	120	872	51,887	.53	.59
December	4,000	[a]513	995	61,180	.61	.70
The year	18,600	105	3,108	2,250,639	1.90	25.77
1898.						
January	763	530	658	40,459	0.40	0.46
February	1,425	530	842	46,762	.51	.54
March	1,242	763	908	55,831	.56	.64
April	5,846	1,018	2,944	175,180	1.80	2.01
May	5,141	2,262	3,206	197,131	1.96	2.26
June	3,744	1,730	2,718	161,732	1.66	1.85
July	1,730	530	959	58,967	.59	.68
August	610	350	480	29,514	.29	.33
September	1,882	220	363	21,600	.22	.24
October	763	350	509	31,297	.31	.36
November	350	290	308	18,327	.19	.21
December	1,181	240	384	23,611	.24	.26
The year	5,846	220	1,190	860,411	.73	9.84

[a] Minimum of 60 second-feet given in Nineteenth Ann. Rept. is error.

Estimated monthly discharge of San Joaquin River at Herndon, Fresno County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,170	170	463	28,469	0.28	0.32
February	1,060	350	645	35,821	.39	.41
March	16,206	692	2,689	165,341	1.64	1.89
April	7,354	2,030	4,233	251,880	2.59	2.88
May	7,090	1,830	3,730	229,350	2.28	2.63
June	9,070	2,620	5,700	339,173	3.48	3.88
July	3,105	955	1,664	104,284	1.02	1.18
August	745	250	428	26,317	.26	.30
September	220	70	152	9,045	.09	.10
October	776	69	214	13,158	.13	.15
November	1,175	130	565	33,620	.34	.39
December	4,775	220	1,018	62,595	.62	.71
The year	16,206	69	1,792	1,299,053	1.09	14.84
1900.						
January	15,932	745	2,244	137,978	1.37	1.58
February	745	355	534	29,657	.33	.34
March	2,780	640	1,748	107,480	1.07	1.23
April	2,780	1,520	2,060	122,578	1.26	1.41
May	9,730	2,170	5,725	352,016	3.50	4.04
June	8,674	3,620	5,728	340,840	3.50	3.90
July	3,445	630	1,642	100,962	1.00	1.15
August	630	240	390	23,980	.24	.28
September	240	180	204	12,139	.13	.14
October	990	180	451	27,730	.28	.32
November	20,780	240	1,834	109,130	1.12	1.25
December	1,285	745	1,033	63,517	.63	.72
The year	20,780	180	1,966	1,428,007	1.20	16.36

Estimated monthly discharge of San Joaquin River at Herndon, Fresno County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	21,372	810	3,506	215,576	2.14	2.47
February	12,940	1,550	4,983	276,742	3.04	3.17
March	6,830	2,480	4,191	257,695	2.56	2.95
April	12,400	1,930	4,680	278,479	2.86	3.18
May	17,870	4,775	10,935	672,367	6.68	7.71
June	15,662	7,882	11,998	713,930	7.33	8.17
July	14,294	3,110	3,466	213,116	2.12	2.45
August	5,850	500	2,373	145,910	1.45	1.67
September	500	360	399	23,742	.24	.27
October	2,480	340	489	30,067	.30	.35
November	1,550	500	702	41,772	.43	.48
December	2,060	460	872	53,617	.53	.61
The year	21,372	340	4,050	2,923,013	2.47	33.48

Discharge measurements of Chiquita San Joaquin River, Madera County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Sept. 27, 1900	J. S. Eastwood	22.6

SAN JOSE CREEK.

Discharge measurements of San Jose Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Aug. —, 1889	G. F. Wright	0.27

The following measurements of San Jose Creek were made by Charles J. Johansen for the Pacific Improvement Company. The pipe line along the West Fork of San Jose Creek was not carrying water in the year 1890.

The point of measurement of the West Fork was a short distance above its junction with the East Fork, or main stream. The main stream, or East Fork, of San Jose Creek was gaged a short distance above its junction with the West Fork, and the pipe line along this stream was not carrying water in the year 1890.

List of discharge measurements of San Jose Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
Feb. 4	Charles J. Johansen	1.57	West Fork at mouth.
Feb. 15	do	.54	Do.
Feb. 28	do	.94	Do.
Mar. 1	do	.60	Do.
Mar. 3	do	.60	Do.
Mar. 5	do	.54	Do.
Mar. 7	do	.54	Do.
Mar. 9	do	.50	Do.
Mar. 11	do	.50	Do.
Mar. 13	do	.44	Do.
Mar. 15	do	.44	Do.
Mar. 17	do	.44	Do.
Mar. 19	do	.50	Do.
Mar. 21	do	.44	Do.
Mar. 23	do	.40	Do.
Mar. 25	do	.40	Do.
Mar. 27	do	.40	Do.
Mar. 29	do	.40	Do.
Mar. 31	do	.40	Do.
Apr. 2	do	.40	Do.
Apr. 4	do	.40	Do.
Apr. 6	do	.40	Do.
Apr. 8	do	.40	Do.
Apr. 10	do	.35	Do.
Apr. 12	do	.40	Do.
Apr. 14	do	.40	Do.
Apr. 15	do	.32	Do.
Apr. 17	do	.29	Do.
Apr. 19	do	.32	Do.
Apr. 21	do	.32	Do.
Apr. 23	do	.32	Do.
Apr. 25	do	.32	Do.
Apr. 27	do	.32	Do.
Apr. 29	do	.35	Do.

List of discharge measurements of San Jose Creek, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
May 1	Charles J. Johanson	0.32	West Fork at mouth.
May 3	do	.26	Do.
May 5	do	.32	Do.
May 7	do	.32	Do.
May 9	do	.26	Do.
May 11	do	.26	Do.
May 12	do	.23	Do.
May 13	do	.26	Do.
May 15	do	.23	Do.
May 17	do	.26	Do.
May 19	do	.26	Do.
May 21	do	.23	Do.
May 23	do	.23	Do.
May 25	do	.23	Do.
May 27	do	.23	Do.
May 29	do	.23	Do.
May 31	do	.21	Do.
June 2	do	.21	Do.
June 4	do	.21	Do.
June 6	do	.21	Do.
June 8	do	.18	Do.
June 10	do	.23	Do.
June 12	do	.21	Do.
June 14	do	.21	Do.
June 16	do	.27	Do.
June 18	do	.21	Do.
June 20	do	.19	Do.
June 22	do	.21	Do.
June 24	do	.17	Do.
June 26	do	.19	Do.
June 28	do	.20	Do.
June 30	do	.20	Do.
July 2	do	.17	Do.
July 4	do	.17	Do.
July 6	do	.18	Do.
July 8	do	.17	Do.
July 10	do	.17	Do.
July 12	do	.17	Do.
July 14	do	.16	Do.

List of discharge measurements of San Jose Creek, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
July 16	Charles J. Johansen	0.16	West Fork at mouth.
July 18	do	.14	Do.
July 20	do	.16	Do.
July 22	do	.14	Do.
July 24	do	.17	Do.
July 26	do	.16	Do.
July 28	do	.17	Do.
July 30	do	.17	Do.
Aug. 1	do	.17	Do.
Aug. 2	do	.17	Do.
Aug. 3	do	.17	Do.
Aug. 4	do	.17	Do.
Aug. 6	do	.17	Do.
Aug. 8	do	.17	Do.
Mar. 1	do	6.38	East Fork above West Fork.
Mar. 3	do	5.76	Do.
Mar. 5	do	5.17	Do.
Mar. 7	do	4.88	Do.
Mar. 9	do	4.59	Do.
Mar. 11	do	4.03	Do.
Mar. 13	do	3.76	Do.
Mar. 15	do	3.51	Do.
Mar. 17	do	3.00	Do.
Mar. 19	do	3.51	Do.
Mar. 21	do	5.11	Do.
Mar. 23	do	4.59	Do.
Mar. 25	do	4.59	Do.
Mar. 27	do	4.31	Do.
Mar. 29	do	4.31	Do.
Mar. 31	do	4.03	Do.
Apr. 2	do	4.03	Do.
Apr. 4	do	3.51	Do.
Apr. 6	do	3.51	Do.
Apr. 8	do	3.51	Do.
Apr. 10	do	3.25	Do.
Apr. 12	do	3.00	Do.
Apr. 14	do	3.00	Do.
Apr. 15	do	1.97	Do.
Apr. 17	do	2.24	Do.

List of discharge measurements of San Jose Creek, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
Apr. 19	Charles J. Johansen	2.10	East Fork above West Fork.
Apr. 21	do	2.10	Do.
Apr. 23	do	1.97	Do.
Apr. 25	do	1.97	Do.
Apr. 27	do	1.97	Do.
Apr. 29	do	2.10	Do.
May 1	do	1.97	Do.
May 3	do	1.72	Do.
May 5	do	1.72	Do.
May 7	do	1.72	Do.
May 9	do	1.72	Do.
May 11	do	1.72	Do.
May 12	do	1.18	Do.
May 13	do	1.59	Do.
May 15	do	1.47	Do.
May 17	do	1.47	Do.
May 19	do	1.47	Do.
May 21	do	1.19	Do.
May 23	do	1.19	Do.
May 25	do	1.25	Do.
May 27	do	1.19	Do.
May 29	do	1.19	Do.
May 31	do	1.19	Do.
June 2	do	1.12	Do.
June 4	do	.94	Do.
June 6	do	.88	Do.
June 8	do	.91	Do.
June 10	do	.91	Do.
June 12	do	.94	Do.
June 14	do	1.00	Do.
June 16	do	1.12	Do.
June 18	do	1.06	Do.
June 20	do	1.00	Do.
June 22	do	.82	Do.
June 24	do	.82	Do.
June 26	do	.88	Do.
June 28	do	.94	Do.
June 30	do	.82	Do.
July 2	do	.76	Do.

List of discharge measurements of San Jose Creek, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
July 4	Charles J. Johansen	0.76	East Fork above West Fork.
July 6	do	.79	Do.
July 8	do	.76	Do.
July 10	do	.71	Do.
July 12	do	.73	Do.
July 14	do	.70	Do.
July 16	do	.70	Do.
July 18	do	.65	Do.
July 20	do	.62	Do.
July 22	do	.60	Do.
July 24	do	.60	Do.
July 26	do	.63	Do.
July 28	do	.54	Do.
July 30	do	.60	Do.
Aug. 1	do	.63	Do.
Aug. 2	do	.63	Do.
Aug. 3	do	.63	Do.
Aug. 4	do	.63	Do.
Aug. 6	do	.63	Do.
Aug. 8	do	.63	Do.
Aug. 11	do	.88	Do.
Aug. 13	do	.88	Do.
Aug. 15	do	.82	Do.
Aug. 17	do	.65	Do.
Aug. 19	do	.60	Do.
Aug. 21	do	.60	Do.
Aug. 23	do	.60	Do.
Aug. 25	do	.65	Do.
Aug. 27	do	.65	Do.
Aug. 29	do	.60	Do.
Aug. 31	do	.60	Do.
Sept. 2	do	.57	Do.
Sept. 4	do	.40	Do.
Sept. 6	do	.44	Do.
Sept. 8	do	.57	Do.
Sept. 10	do	.44	Do.
Sept. 12	do	.54	Do.
Sept. 14	do	.50	Do.

List of discharge measurements of San Jose Creek, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality
1890.		*Sec.-feet.*	
Sept. 15	Charles J. Johansen	0.60	East Fork above West Fork.
Sept. 18	do	.60	Do.
Sept. 20	do	.65	Do.
Sept. 22	do	.60	Do.
Sept. 24	do	.71	Do.
Sept. 26	do	.71	Do.
Sept. 28	do	.82	Do.
Sept. 30	do	.71	Do.
Oct. 2	do	.71	Do.
Oct. 4	do	.68	Do.
Oct. 6	do	.60	Do.
Oct. 7	do	.61	Do.

SAN LUIS REY RIVER.

Discharge measurements of San Luis Rey River, San Diego County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
June 20, 1899	S. G. Bennett	1.04	Headworks Escondido Irrigation District canal.
Aug. 19, 1900	H. N. Savage	2.00	Do.
Sept. —, 1899	do	2.50	4 miles east of Sicklers Mill, Pala.
Sept. —, 1899	do	[a] 3.50	
Apr. 2, 1900	do	10.00	Do.
May —, 1894	E. F. Tabor	6,716	
Oct. —, 1894	do	4	
Dec. 8, 1894	do	10	
Dec. 20, 1894	do	240	
Jan. 15, 1895	do	5,000	
Mar. 8, 1895	do	152	
Apr. 11, 1895	do	100	
Apr. 17, 1895	do	72	
May 10, 1895	do	39	
May 19, 1895	do	19	

[a] H. N. Savage states this to be minimum prior to September, 1899.

SAN MATEO CREEK.

San Francisco obtains its domestic water supply from a series of impounding reservoirs located in the southern portion of the peninsula between San Francisco Bay and the Pacific Ocean. The drainage basin of these reservoirs ranges in elevation from 250 to 1,800 feet, with an average of about 750 feet. The hills are undulating. There is a limited growth of timber on the northern slopes near the summit, but a large amount of brush covers other portions of the basin. On the southern slopes and crests the hills are frequently bare of brush, but are covered with grasses. The Spring Valley Water Company owns the entire area of the drainage basin and protects the forest covering, not even permitting grazing within its limits. Mr. Herman Schussler, chief engineer of the water company, has furnished this office with a statement of the rainfall and run-off of the drainage basins which contribute to the water supply under the control of the company. The table given below extends from 1869 to 1899, and shows the seasonal rainfall, together with the percentage collected in the reservoirs. The record is therefore thirty years in length. It is by far the oldest table of run-off in the State, and for this reason is of unusual value. The seasonal year rather than the calendar is given. Column No. 1 shows the year; column No. 2 the inches of rainfall in the respective basins; column No. 3 the percentage of this rainfall which is caught and delivered, the evaporation being deducted. The portion of the discharge table marked "Southeasterly portion of the watershed southeast of old dam," etc., refers to the area above the reservoir, which was constructed at an early date. At a later period, at a point lower down the stream, the Crystal Springs dam was constructed and flooded water over the top of the original dam and into the valleys of other streams. This explains the change in the description of the drainage basin which occurs in 1888. The portion of the table marked "Above southeasterly and northeasterly portion of peninsula watershed, total Crystal Lake drainage," is for the entire area above the Crystal Springs gage datum. The remarkable variation in percentage strikingly illustrates the necessity for storing water from the drainage basins in order to provide for periods of drought. In the western portion of the drainage basin there was practically no run-off in the season of 1876–77, and in the easterly portion of the basin there was practically no run-off in the seasons of 1881–82, 1882–83, and 1897–98. It would therefore be necessary to store enough water in the reservoirs to furnish a supply for two summers and at least one winter. Another feature of interest in this table is that while the run-off in the seasons of 1881–82 and 1882–83 was practically nothing from the easterly portion of the basin, the percentage of rainfall in the western portion of the watershed was 29.4 and 23, respectively.

Rainfall and run-off from basin of San Mateo Creek, California.

Year.	Rainfall.	Run-off.
Western portion of peninsula watershed:	*Inches.*	*Per cent.*
1869–70	41.95	22.6
1870–71	34.70	9.8
1871–72	80.42	31.4
1872–73	39.31	28.4
1873–74	48.88	29.5
1874–75	44.26	21.2
1875–76	69.24	39.2
1876–77	23.83	.7
1877–78	72.51	37.8
1878–79	56.10	29.2
1879–80	56.14	35.0
1880–81	53.81	43.0
1881–82	34.23	29.4
1882–83	33.89	23.0
1883–84	54.99	33.2
1884–85	38.25	30.0
1885–86	51.90	43.9
1886–87	34.44	29.1
1887–88	37.53	29.2
1888–89	41.17	28.1
1889–90	73.67	44.7
1890–91	37.69	22.8
1891–92	43.10	13.3
1892–93	58.25	24.4
1893–94	54.90	21.8
1894–95	66.93	25.2
1895–96	49.45	21.0
1896–97	50.47	34.0
1897–98	26.26	9.6
1898–99	42.56	17.7
Total	1,450.83	808.2
Mean	48.36	26.94

Year.	Rainfall.	Run-off.
Southeasterly portion of peninsula watershed (southeast from old dam):	*Inches.*	*Per cent.*
1877–78	57.70	29.3
1878–79	43.12	12.2
1879–80	48.01	15.1
1880–81	38.78	34.1
1881–82	25.02	.9
1882–83	23.06	.0
1883–84	40.32	26.8
1884–85	25.67	13.1
1885–86	35.58	25.4
1886–87	28.61	9.7
1887–88	32.96	5.3
1888–89	35.70	7.4
Total	434.53	179.5
Mean	36.21	14.94
Above southeasterly and northeasterly portions of peninsula watershed, total Crystal Lake drainage:		
1889–90	72.68	53.2
1890–91	31.92	24.4
1891–92	24.16	8.0
1892–93	47.07	34.3
1893–94	33.08	29.0
1894–95	55.77	33.8
1895–96	32.62	16.2
1896–97	35.62	19.3
1897–98	18.17	0.0
1898–99	30.37	11.0
Total	381.46	230.1
Mean	38.15	23.01

SAN ROQUI CREEK.

San Roqui Creek was measured during the year 1890 by Charles J. Johansen for the Pacific Improvement Company. The point of measurement was a short distance below the San Roqui tunnel, which was being built from 1899 to 1901, the point of measurement being near an old dam in the stream. This drainage line is called San Roqui Creek in its mountainous portions, but lower down and south of the Southern Pacific Railroad it is called the Arroyo Burro.

List of discharge measurements of San Roqui Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
Feb. 13	Charles J. Johansen	4.96	At old diversion box below tunnel.
Feb. 19	do	5.70	Do.
Feb. 21	do	9.61	Do.
Feb. 26	do	11.03	Do.
Mar. 1	do	6.91	Do.
Mar. 3	do	6.28	Do.
Mar. 5	do	5.67	Do.
Mar. 6	do	5.67	Do.
Mar. 8	do	5.20	Do.
Mar. 10	do	5.20	Do.
Mar. 12	do	4.96	Do.
Mar. 14	do	4.96	Do.
Mar. 16	do	4.27	Do.
Mar. 18	do	4.27	Do.
Mar. 20	do	4.73	Do.
Mar. 22	do	4.73	Do.
Mar. 24	do	4.27	Do.
Mar. 26	do	3.84	Do.
Mar. 28	do	3.84	Do.
Mar. 30	do	3.84	Do.
Apr. 1	do	3.42	Do.
Apr. 3	do	3.42	Do.
Apr. 5	do	3.42	Do.
Apr. 7	do	3.21	Do.
Apr. 9	do	3.21	Do.
Apr. 11	do	3.00	Do.
Apr. 13	do	2.80	Do.
Apr. 15	do	2.62	Do.
Apr. 17	do	2.62	Do.
Apr. 19	do	2.42	Do.
Apr. 21	do	2.15	Do.
Apr. 23	do	1.88	Do.
Apr. 25	do	1.80	Do.
Apr. 27	do	1.80	Do.
Apr. 29	do	1.55	Do.
May 1	do	1.55	Do.
May 3	do	1.39	Do.
May 5	do	1.39	Do.
May 7	do	1.39	Do.
May 9	do	1.23	Do.
May 11	do	1.23	Do.

List of discharge measurements of San Roqui Creek, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
May 13	Charles J. Johansen	1.30	At old diversion box below tunnel.
May 15	do	1.23	Do.
May 17	do	1.23	Do.
May 19	do	1.23	Do.
May 20	do	.63	Do.
May 22	do	.65	Do.
May 24	do	.65	Do.
May 26	do	.65	Do.
May 28	do	.54	Do.
May 30	do	.54	Do.
June 2	do	.52	Do.
June 4	do	.52	Do.
June 5	do	.44	Do.
June 7	do	.40	Do.
June 9	do	.35	Do.
June 11	do	.35	Do.
June 13	do	.35	Do.
June 15	do	.35	Do.
June 17	do	.38	Do.
June 19	do	.38	Do.
June 21	do	.38	Do.
June 23	do	.38	Do.
June 25	do	.35	Do.
June 27	do	.35	Do.
June 29	do	.29	Do.
July 1	do	.29	Do.
July 3	do	.29	Do.
July 5	do	.29	Do.
July 7	do	.29	Do.
July 9	do	.29	Do.
July 11	do	.26	Do.
July 13	do	.26	Do.
July 15	do	.26	Do.
July 17	do	.26	Do.
July 19	do	.23	Do.
July 21	do	.20	Do.
July 23	do	.20	Do.
July 25	do	.20	Do.
July 27	do	.20	Do.
July 29	do	.20	Do.
July 31	do	.24	Do.

List of discharge measurements of San Roqui Creek, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1890.		*Sec.-feet.*	
Aug. 2	Charles J. Johansen	0.24	At old diversion box below tunnel.
Aug. 4	do	.24	Do.
Aug. 6	do	.24	Do.
Aug. 8	do	.26	Do.
Aug. 10	do	.26	Do.
Aug. 12	do	.26	Do.
Aug. 14	do	.23	Do.
Aug. 16	do	.23	Do.
Aug. 18	do	.20	Do.
Aug. 19	do	.20	Do.
Aug. 22	do	.17	Do.
Sept. 2	do	.19	Do.
Sept. 3	do	.19	Do.
Sept. 4	do	.19	Do.
Sept. 5	do	.19	Do.
Sept. 6	do	.19	Do.
Sept. 7	do	.19	Do.
Sept. 8	do	.19	Do.
Sept. 10	do	.19	Do.
Sept. 11	do	.19	Do.
Sept. 12	do	.19	Do.
Sept. 13	do	.19	Do.
Sept. 14	do	.19	Do.
Aug. 26	do	.09	Below old diversion box.
Aug. 28	do	.09	Do.
Aug. 30	do	.07	Do.
Sept. 2	do	.04	Do.
Sept. 4	do	.04	Do.
Sept. 6	do	.05	Do.
Sept. 8	do	.04	Do.
Sept. 10	do	.04	Do.
Sept. 12	do	.04	Do.
Sept. 14	do	.04	Do.

SANTA ANA RIVER.

The river has its source on the southwestern slope of the San Bernardino Mountains and flows west, appearing from its canyon 6 miles northeast of Redlands. Its waters are completely used in San Bernardino Valley. At the lower part of the valley the water appears again in the vicinity of Rincon, where the river passes through a

comparatively narrow gorge, and the stream flows thence in a general southwesterly direction, emptying into the Pacific Ocean. The station, established June, 1896, is located 5 miles northeast of Mentone, Cal., three-fourths of a mile below the head works of the Santa Ana canal and opposite the warm springs in the canyon. The gage is an inclined timber fastened to a large bowlder and posts set in the bank of the river. On October 16, 1898, owing to some local legal complications, an unusually large volume of water was turned into the Santa Ana canal by the Bear Valley Company. This water was wasted from the canal at a point below the old gage rod, necessitating the establishment of a new gage rod upon this stream at a point below where the waste from the canal was turned into the river. The new gage was put in November 9, 1898, and since that date daily observations have been kept on the lower gage, which is a 2 by 6 inch timber firmly bolted to a granite cliff, which forms the left bank of the river, and is situated 800 feet below the mouth of Warmsprings Canyon and 100 feet above a ford on the canyon road. A landslide occurred below the gage rod April 16, 1899, which changed the condition of the rating for the station. Owing to the shifting nature of the stream bed it has not been possible to construct perfectly satisfactory rating curves, but the tables as presented are based on the best information that could be obtained. This river is one of the most difficult streams in the State to accurately gage. The Edison Electric Company diverts the greater portion of the water of Santa Ana River above the gaging station, but also returns all of it above the station. Only limited portions of the water are allowed to pass out of the conduits during certain hours of the day, the water being held back for the purpose of obtaining additional power when the greatest demand exists. An effort is being made to arrange with this company to obtain a record of the number of gates, the sizes of the openings, and the hours at which the various wheels are run, in order to more accurately determine the volumes of water. The Santa Ana canal, as mentioned above, also diverts water from Santa Ana River above the station, but the greater part of it is returned to the channel of the stream before passing the point of measurement.

It was found that this station could not be used during high water, and on January 1, 1901, observations were resumed at the old station and on Santa Ana Canal near the river station.

From June 1 to December 31, 1901, and for the entire year 1902, except from February 26 to April 23, inclusive, the discharge of Santa Ana River was obtained by observations on the weirs at the head works of Green Spot pipe line, Highlands canal, and Redlands canal. The flow from Redlands tunnel and Morton Canyon was assumed to offset the loss by evaporation between the old gaging station and the mouth of the canyon.

The drainage area used prior to 1902 was obtained from Land Office maps. Subsequently the Geological Survey completed its contour

map of this basin and an area of 182 square miles above the gaging station was obtained therefrom and was accepted.

Discharge measurements of Alder Creek, a branch of Santa Ana River, San Bernardino County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
August 8, 1897	A. Q. Campbell	0.88
August 31, 1897	do	1.00
November 14, 1897	J. B. Lippincott	2.00
April 14, 1900	S. G. Bennett	1.90
October 8, 1901	do	.89

Discharge measurements of Santa Ana River above mouth of Bear Creek, San Bernardino County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
July 27, 1896	J. H. Quinton	14.2
August 31, 1897	A. Q. Campbell	17.9
November 14, 1897	J. B. Lippincott	17.5

The discharge of the streams of southern California was unusually low in September, 1898, and these measurements were made to determine this minimum with its hourly fluctuation.

Discharge measurements of Santa Ana River above mouth of Bear Creek.

[Measurements by Edison Electric Company.]

Date.	Discharge.	Date.	Discharge.
Sept. 15, 1898:	*Sec.-feet.*	Sept. 15, 1898—Continued.	*Sec.-feet.*
7 a. m	8.22	1.30 p. m	7.12
7.30 a. m	8.22	2 p. m	7.20
8 a. m	8.22	2.30 p. m	7.06
8.30 a. m	8.22	3 p. m	6.92
9 a. m	8.22	3.30 p. m	6.86
9.30 a. m	8.22	4 p. m	6.66
10 a. m	8.46	4.30 p. m	6.98
10.30 a. m	8.10	5 p. m	6.44
11 a. m	7.98	5.30 p. m	6.22
11.30 a. m	7.86	6 p. m	6.22
12 m	7.76	6.30 p. m	6.10
12.30 p. m	7.48		
1 p. m	7.54	12-hour mean	7.43

Discharge measurements of Santa Ana River, etc.—Continued.

Date.	Discharge.
Sept. 15, 1898—Continued.	*Sec.-feet.*
7 p. m	6.10
7.30 p. m	6.10
8 p. m	6.10
8.30 p. m	6.02
9 p. m	6.02
9.30 p. m	6.02
10 p. m	6.02
10.30 p. m	6.02
11 p. m	6.32
11.30 p. m	6.96
12 midnight	6.60
Sept. 16, 1898:	
12.30 a. m	6.66
1 a. m	6.66
1.30 a. m	6.86
2 a. m	6.92
2.30 a. m	7.06
3 a. m	7.20
3.30 a. m	7.32
4 a. m	7.54
4.30 a. m	7.66
5 a. m	7.66
5.30 a. m	7.86
6 a. m	7.76
6.30 a. m	7.76
12-hour mean	6.80
7 a. m	7.76
7.30 a. m	7.76
8 a. m	8.10
8.30 a. m	7.98
9 a. m	8.04
9.30 a. m	8.10
10 a. m	7.82
10.30 a. m	7.98
11 a. m	7.86
11.30 a. m	7.76
12 m	7.48
12.30 p. m	7.44
1 p. m	7.32
1.30 p. m	7.32
2 p. m	7.20
2.30 p. m	7.06
3 p. m	6.86
3.30 p. m	6.66
4 p. m	6.44
4.30 p. m	6.32
5 p. m	6.22
5.30 p. m	6.10
6 p. m	6.02
6.30 p. m	6.02
12-hour mean	7.23
7 p. m	6.20
7.30 p. m	6.20
8 p. m	6.20
8.30 p. m	6.20
9 p. m	5.76
9.30 p. m	5.92
10 p. m	5.92
10.30 p. m	6.02
11 p. m	6.22
11.30 p. m	6.32
12 midnight	6.32
Sept. 17, 1898:	
12.30 a. m	6.44
1 a. m	6.66
1.30 a. m	6.76
2 a. m	6.86
2.30 a. m	6.92
3 a. m	7.06
3.30 a. m	7.20
4 a. m	7.32
4.30 a. m	7.32
5 a. m	7.54
5.30 a. m	7.54
6 a. m	7.66
6.30 a. m	7.76
12-hour mean	6.68

Discharge measurements of Bear Creek above Santa Ana River, San Bernardino County.

[Measurements by Edison Electric Co.]

Date.	Discharge.	Date.	Discharge.
Sept. 15, 1898:	*Sec.-feet.*	Sept. 16, 1898:	*Sec.-feet.*
7 a. m	23.30	12.30 a. m	19.74
7.30 a. m	23.30	1 a. m	19.74
8 a. m	23.30	1.30 a. m	19.54
8.30 a. m	25.94	2 a. m	19.34
9 a. m	23.30	2.30 a. m	19.14
9.30 a. m	23.30	3 a. m	18.72
10 a. m	23.30	3.30 a. m	18.72
10.30 a. m	23.10	4 a. m	18.32
11 a. m	23.10	4.30 a. m	18.32
11.30 a. m	22.84	5 a. m	18.12
12 m	22.66	5.30 a. m	18.12
12.30 p. m	22.66	6 a. m	17.92
1 p. m	22.66	6.30 a. m	17.80
1.30 p. m	22.66	12-hour mean	19.84
2 p. m	22.66		
2.30 p. m	22.66	7 a. m	17.92
3 p. m	22.66	7.30 a. m	17.92
3.30 p. m	22.44	8 a. m	17.80
4 p. m	22.44	8.30 a. m	16.94
4.30 p. m	22.44	9 a. m	17.34
5 p. m	22.02	9.30 a. m	17.24
5.30 p. m	22.02	10 a. m	17.12
6 p. m	22.02	10.30 a. m	17.12
6.30 p. m	21.80	11 a. m	16.84
12-hour mean	22.86	11.30 a. m	16.94
		12 m	16.56
7 p. m	21.60	12.30 p. m	16.94
7.30 p. m	21.60	1 p. m	16.76
8 p. m	21.60	1.30 p. m	16.76
8.30 p. m	21.40	2 p. m	16.56
9 p. m	21.06	2.30 p. m	16.56
9.30 p. m	21.18	3 p. m	16.56
10 p. m	20.98	3.30 p. m	16.56
10.30 p. m	20.98	4 p. m	16.38
11 p. m	20.78	4.30 p. m	16.38
11.30 p. m	21.60	5 p. m	16.38
12 midnight	19.94	5.30 p. m	16.38

Discharge measurements of Bear Creek, etc.—Continued.

Date.	Discharge.	Date.	Discharge.
Sept. 16, 1898—Continued.	*Sec.-feet.*	Sept. 17, 1898:	*Sec.-feet.*
6 p. m	16.38	12.30 a. m	16.38
6.30 p. m	16.38	1 a. m	16.38
12-hour mean	16.86	1.30 a. m	16.38
		2 a. m	16.38
7 p. m	16.38	2.30 a. m	16.38
7.30 p. m	16.28	3 a. m	16.38
8 p. m	16.28	3.30 a. m	16.38
8.30 p. m	16.28	4 a. m	16.38
9 p. m	16.18	4.30 a. m	16.38
9.30 p. m	16.38	5 a. m	16.38
10 p. m	16.38	5.30 a. m	16.38
10.30 p. m	16.38	6 a. m	16.38
11 p. m	16.38	6.30 a. m	16.38
11.30 p. m	16.38	12-hour mean	16.36
12 midnight	16.38		

Discharge measurements of Bear Creek above Santa Ana River, San Bernardino County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
July 27, 1896	J. H. Quinton	70.6
Aug. 31, 1897	A. Q. Campbell	54.3
Nov. 14, 1897	J. B. Lippincott	8.95

Discharge measurements of Green Spot Pipe Line, Santa Ana River, San Bernardino County.

Date.	Hydrographer.	Discharge.
1896.		*Sec.-feet.*
Nov. 21	J. B. Lippincott	0.40
1898.		
Jan. 8	J. B. Lippincott	.38
Apr. 12	do	[a] 1.88
Apr. 12	do	[b] 1.74
Apr. 29	do	2.94
June 12	do	.63
July 23	do	2.20
Sept. 8	do	0.00
Oct. 18	F. H. Olmsted	1.36
Nov. 9	do	.50
Dec. 8	do	.50
Dec. 8	do	[b] .15

[a] Intake. [b] Outlet (lower end).

Discharge measurements of Green Spot Pipe Line, etc.—Continued.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
Jan. 12	S. G. Bennett	0.00
Feb. 18	do	[a] 3.53
Feb. 18	do	[b] .35
Mar. 23	do	3.71
May 6	do	[a] 1.43
May 6	do	[b] .62
May 31	do	.14
July 15	do	[a] .59
July 15	do	[b] .44
July 27	do	[a] .64
July 27	do	[b] .54
Aug. 24	do	[b] .28
1900.		
April 14	S. G. Bennett	2.15
July 13	do	[a] 0.00
Oct. 2	W. W. Cockins, jr	[a] .12
1901.		
Feb. 5	S. G. Bennett	[a] 0.00
Mar. 4	do	[a] 2.73
Mar. 30	do	[a] 0.00
July 6	do	[a] 3.68
July 6	do	[b] 3.49
Aug. 20	do	0.00
Oct. 8	do	5.77
Dec. 5	do	1.65
1902.		
May 31	S. G. Bennett	[a] 2.70
May 31	do	[b] 2.50
July 10	do	[a] 0.00
Sept. 3	W. W. Clapp	[a] 0.00
Nov. 5	S. G. Bennett	[a] 2.83

[a] Intake. [b] Outlet (lower end).

Estimated monthly discharge of Bear Valley Water, Green Spot Pipe Line, Santa Ana River, at head of Crafton ditch, San Bernardino County.

Month.	Mean discharge.	Month.	Mean discharge.
1897.	*Sec.-feet.*	1899.	*Sec.-feet.*
August	21.5	July	5.8
September	15.8	August	5.8
October 1 to 21	13.2	September	4.1
1898.		October	6.6
April	17.0	November	8.6
May	17.2	December	9.5
June	13.2	1900.	
July	9.1	January	2.1
August	9.1	February	2.5
September	8.2	March	1.5
October	9.0	April	2.3
November	10.0	May	1.9
December	10.7	June	.4
1899.		July 1 to 15	1.1
January 1 to 9	11.0	August	0
February	11.6	September	0
March	12.2	October	0
April	11.8	November	0
May	11.2	December	0
June	5.4		

Estimated monthly discharge of Green Spot Pipe Line, Santa Ana River, at Headworks Weir, San Bernardino County.

Month.	Mean discharge.	Month.	Mean discharge.
1901.	*Sec.-feet.*	1901—Continued.	*Sec.-feet.*
June	1.5	October	5.7
July	2.3	November	1.7
August	2.7	December	1.2
September	5.5		

Discharge measurements of Highlands or North Fork Canal at intake weir, Santa Ana River, San Bernardino County.

Date.	Hydrographer.	Discharge.
1896.		*Sec.-feet.*
Nov. 21	J. B. Lippincott	8.50
1898.		
Jan. 8	J. B. Lippincott	11.91
Mar. 9	H. Crowe	10.76
Apr. 12	J. B. Lippincott	12.40
Apr. 29	do	17.03
June 12	do	11.37
Sept. 8	do	13.29
Oct. 18	F. H. Olmsted	9.85
Nov. 9	do	8.12
Dec. 8	do	6.95
1899.		
Feb. 18	S. G. Bennett	8.07
Mar. 23	do	11.78
May 6	do	7.70
May 31	do	6.74
June 15	do	10.30
July 15	do	13.14
July 27	do	11.92
Aug. 24	do	4.28
1900.		
Apr. 14	S. G. Bennett	7.48
July 13	do	(*a*)
Oct. 2	W. W. Cockins, jr	5.61
1901.		
July 6	S. G. Bennett	13.28
Aug. 20	do	15.79
Oct. 8	do	14.30
Dec. 5	do	8.53
May 31	do	7.90
1902.		
July 10	S. G. Bennett	11.50
Sept. 3	W. B. Clapp	11.10
Nov. 5	S. G. Bennett	10.02

a Water not going through weir basin; weir was being repaired.

Discharge measurements of Santa Ana River above Keller Creek, San Bernardino County.[a]

[Measurements by Edison Electric Company.]

Date.	Discharge.	Date.	Discharge.
Sept. 15, 1898:	*Sec.-feet.*	Sept. 16, 1898:	*Sec.-feet.*
7 a. m	29.30	12.30 a. m	27.08
7.30 a. m	30.44	1 a. m	27.08
8 a. m	23.30	1.30 a. m	27.08
8.30 a. m	30.44	2 a. m	27.08
9 a. m	30.44	2.30 a. m	26.02
9.30 a. m	30.44	3 a. m	26.02
10 a. m	30.44	3.30 a. m	26.02
10.30 a. m	30.44	4 a. m	26.02
11 a. m	30.44	4.30 a. m	26.02
11.30 a. m	30.44	5 a. m	24.92
12 m	29.30	5.30 a. m	24.92
12.30 p. m	29.30	6 a. m	24.92
1 p. m	29.30	6.30 a. m	24.92
1.30 p. m	29.30	12-hour mean	27.06
2 p. m	29.30		
2.30 p. m	29.30	7 a. m	24.92
3 p. m	29.30	7.30 a. m	24.92
3.30 p. m	28.20	8 a. m	24.92
4 p. m	28.20	8.30 a. m	24.92
4.30 p. m	28.20	9 a. m	24.92
5 p. m	28.20	9.30 a. m	24.92
5.30 p. m	28.20	10 a. m	24.92
6 p. m	28.20	10.30 a. m	24.92
6.30 p. m	29.30	11 a. m	24.92
12-hour mean	29.16	11.30 a. m	24.92
		12 m	24.92
7 p. m	29.30	12.30 p. m	23.86
7.30 p. m	28.22	1 p. m	23.86
8 p. m	28.20	1.30 p. m	23.86
8.30 p. m	28.20	2 p. m	22.80
9 p. m	28.20	2.30 p. m	22.80
9.30 p. m	28.20	3 p. m	22.80
10 p. m	28.20	3.30 p. m	22.80
10.30 p. m	28.20	4 p. m	22.80
11 p. m	28.20	4.30 p. m	21.80
11.30 p. m	28.20	5 p. m	21.80
12 midnight	28.20	5.30 p. m	21.80

[a] The discharge of the streams of southern California was unusually low in September, 1898, and these measurements were made by the Edison Electric Company to determine this minimum with its hourly fluctuation.

Discharge measurements of Santa Ana River, etc.—Continued.

Date.	Discharge.	Date.	Discharge.
Sept. 16, 1898—Continued.	*Sec.-feet.*	Sept. 17, 1898:	*Sec.-feet.*
6 p. m	21.80	12.30 a. m	22.80
6.30 p. m	22.80	1 a. m	22.80
12-hour mean	23.74	1.30 a. m	23.86
		2 a. m	23.86
7 p. m	22.80	2.30 a. m	23.86
7.30 p. m	22.80	3 a. m	23.86
8 p. m	22.80	3.30 a. m	23.86
8.30 p. m	23.86	4 a. m	23.86
9 p. m	23.86	4.30 a. m	23.86
9.30 p. m	22.80	5 a. m	23.86
10 p. m	22.80	5.30 a. m	22.80
10.30 p. m	22.80	6 a. m	21.80
11 p. m	22.80	6.30 a. m	22.80
11.30 p. m	22.80	12-hour mean	23.20
12 midnight	22.80		

Discharge measurements of Keller Creek, a tributary of Santa Ana River.

Date.	Hydrographer.	Discharge.
1897.		*Sec.-feet.*
Nov. 14	A. Q. Campbell	1.00
1900.		
Apr. 14	S. G. Bennett	.67

Discharge measurements of Morton Canyon Water, tributary to Santa Ana River.

Date.	Hydrographer.	Discharge.
1898.		*Sec.-feet.*
Apr. 12	J. B. Lippincott	0.20
Apr. 29	do	.20
June 12	do	.12
1899.		
May 31	S. G. Bennett	.23
June 15	do	.17
July 15	do	.12
Aug. 24	do	.11
1900.		
Apr. 14	S. G. Bennett	.29
July 13	do	.09
Oct. 2	W. W. Cockins, jr	.12

Discharge measurements of Redlands or South Fork canal weir at Sand Box, tributary to Santa Ana River.

Date.	Hydrographer.	Discharge.
1896.		*Sec.-feet.*
July 29	J. H. Quinton	40.62
Nov. 21	J. B. Lippincott	12.00
1898.		
Jan. 8	J. B. Lippincott	21.32
Mar. 9	H. Crowe	22.22
Apr. 12	J. B. Lippincott	16.70
Apr. 29	do	13.00
June 12	do	18.40
July 23	do	15.00
Sept. 8	do	15.40
Oct. 18	F. H. Olmsted	7.26
Nov. 9	do	10.20
Dec. 8	do	12.00
1899.		
Jan. 12	S. G. Bennett	15.10
Feb. 18	do	15.70
Mar. 23	do	17.00
May 6	do	15.49
May 31	do	14.67
June 15	do	7.76
June 27	do	12.40
July 15	do	12.70
Aug. 24	do	5.71

Discharge measurements of Redlands or South Fork canal weir, etc.—Cont'd.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
Apr. 14	S. G. Bennett	12.10
July 13	do	10.65
Oct. 2	W. W. Cockins, jr	6.25
1901.		
Mar. 30	S. G. Bennett	30.00
May 31	do	19.60
July 6	do	19.91
Aug. 20	do	16.75
Oct. 8	do	24.10
Dec. 5	do	14.27
1902.		
July 10	S. G. Bennett	10.06
Sept. 3	W. B. Clapp	14.60
Nov. 5	S. G. Bennett	7.55

Discharge measurements of Redlands or Bolen tunnel, tributary to Santa Ana River.

Date.	Hydrographer.	Discharge.
1896.		*Sec.-feet.*
Nov. 21.	J. B. Lippincott	1.00
1898.		
June 12	J. B. Lippincott	1.24
Sept. 8	do	1.24
1899.		
June 15	S. G. Bennett	.67
July 15	do	1.03
Aug. 24	do	1.10
1900.		
Apr. 14	S. G. Bennett	.88
July 13	do	.84
Oct. 2	W. W. Cockins, jr	.85
1901.		
July 6	S. G. Bennett	1.40
Dec. 5	do	.90
1902.		
July 10	do	.90

Discharge measurements of Santa Ana Canal, San Bernardino County. [a]

Date.	Hydrographer.	Discharge.
1896.		*Sec.-feet.*
June 20	J. B. Lippincott	18.28
July 28	J. H. Quinton	14.98
Nov. 21	J. B. Lippincott	3.50
1897.		
Jan. 27	J. B. Lippincott	4.00
Mar. 4	do	5.00
June 15	do	19.00
July 1	do	18.50
July 6	A. Q. Campbell	12.42
July 6	do	11.02
Aug. 8	do	18.68
Aug. 31	do	18.49
Sept. 30	do	22.95
Nov. 14	do	7.29
1898.		
Jan. 8	A. Q. Campbell	8.72
Mar. 9	do	7.04
Apr. 2	J. B. Lippincott	12.66
Apr. 12	do	7.67
June 12	do	3.92
July 23	do	5.34
Sept. 8	do	1.66
Oct. 18	F. H. Olmsted	7.92
Nov. 9	do	19.50
Dec. 8	do	20.60
1899.		
Jan. 12	S. G. Bennett	.00
Feb. 18	do	4.00
Mar. 23	do	7.60
May 6	do	3.40
May 31	do	1.10
June 15	do	.20
July 15	do	.00
July 27	do	.00
Aug. 24	do	.00

[a] For total flow of river and canal see Santa Ann River, total flow.

Discharge measurements of Santa Ana Canal, etc.—Continued.

Date.	Hydrographer.	Discharge.
1901.		*Sec.-feet.*
Mar. 30	S. G. Bennett	3.40
Oct. 8	do	13.20
Dec. 5	do	9.70
1902.		
May 31	S. G. Bennett	20.70
July 10	do	18.5
Sept. 3	W. B. Clapp	14.2
Nov. 5	S. G. Bennett	12.7

Discharge measurements of Santa Ana River and Canal at Warm Spring, San Bernardino County.

Date.	Hydrographer.	Gage height.	Discharge.
1896.		*Feet.*	*Sec.-feet.*
Apr. 27	J. A. Vogleson		51.00
July 25	J. H. Quinton		75.00
June 20	J. B. Lippincott		[a]61.77
Do	do		[b]18.28
	Total		80.05
1896.			
July 28	J. H. Quinton	1.29	[a]59.72
Do	do		[b]14.98
	Total		74.70
Nov. 21	J. B. Lippincott	.98	[a]31.68
Do	do		[b]3.50
	Total		35.18
Nov. 21	J. B. Lippincott		[c]27.40
1897.			
Jan. 27	J. B. Lippincott		[a]43.58
Do	do		[b]4.00
	Total		47.58
Mar. 4	J. B. Lippincott		[a]100.70
Do	do		[b]5.00
	Total		105.70

[a] River. [b] Santa Ana Canal. [c] Total flow at mouth of canyon.

Discharge measurements of Santa Ana River and Canal, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1897.		*Feet.*	*Sec.-feet.*
June 15	J. B. Lippincott	1.15	[a] 63.74
Do	do		[b] 19.00
	Total		82.74
July 1	A. Q. Campbell	1.20	[a] 72.29
Do	do		[b] 18.50
	Total		90.79
July 6	A. Q. Campbell	1.1	[a] 60.35
Do	do		[b] 11.02
	Total		71.37
Aug. 8	A. Q. Campbell	1.32	[a] 56.28
Do	do		[b] 18.68
	Total		74.96
Aug. 8	A. Q. Campbell		[c] 83.22
Aug. 31	do		[d] 78.10
Do	do		[c] 78.37
Sept. 30	do		64.53
Do	do	1.13	[a] 42.53
Do	do		[b] 22.95
	Total		65.48
Nov. 14	A. Q. Campbell	1.25	[a] 39.92
Do	do		[b] 7.29
	Total		47.21
1898.			
Jan. 8	J. B. Lippincott	1.00	[a] 25.56
Do	do		[b] 8.72
	Total		34.28
Mar. 9	H. Crowe	1.05	[a] 43.78
Do	do		[b] 7.04
	Total		50.82

[a] River.
[b] Santa Ana Canal.
[c] Weir above Santa Ana Canal intake.
[d] Meter above Santa Ana Canal intake.

Discharge measurements of Santa Ana River and Canal, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1898.		*Feet.*	*Sec.-feet.*
Mar. 9	H. Crowe		[a] 68.01
Apr. 11	J. B. Lippincott	.98	[b] 31.61
Do	do		[c] 7.67
	Total		39.28
Apr. 29	J. B. Lippincott	.90	[b] 29.67
Do	do		[c] 12.66
	Total		42.33
June 12	J. B. Lippincott	1.10	[b] 35.14
Do	do		[c] 3.92
	Total		39.06
July 23	J. B. Lippincott	1.10	[b] 42.22
Do	do		[c] 5.34
	Total		47.56
Sept. 8	J. B. Lippincott	1.05	[b] 35.01
Do	do		[c] 1.66
	Total		36.67
Oct. 18	F. H. Olmsted	.95	[b] 22.78
Do	do		[c] 7.92
	Total		30.70
Nov. 9	F. H. Olmsted	1.10	[d] 21.78
Dec. 8	do	1.13	[d] 24.74
1899.			
Jan. 12	S. G. Bennett	1.07	[b] 38.00
Do	do		[c] 0
	Total		38.00
Feb. 18	S. G. Bennett	[e] 2.16	[b] 28.04
Do	do		[c] 4.00
	Total		32.04
Mar. 23	S. G. Bennett	2.30	[b] 29.62
Do	do		[c] 7.60
	Total		37.22

[a] Above Santa Ana Canal intake.
[b] River.
[c] Canal.
[d] Total water from Santa Ana Canal wasted above gaging station.
[e] New rod.

Discharge measurements of Santa Ana River and Canal, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1899.		*Feet.*	*Sec.-feet.*
May 6	S. G. Bennett	2.45	[a]25.84
Do	do		[b]3.40
	Total		29.24
May 31	S. G. Bennett	2.27	[a]21.00
Do	do		[b]1.10
	Total		22.10
June 15	S. G. Bennett	2.21	[a]19.60
Do	do		[b].20
	Total		19.80
July 15	S. G. Bennett	2.30	[a]25.90
Do	do		[b]0
July 27	do	2.3	[a]23.55
Do	do		[b]0
Aug. 24	do	1.85	[a]10.86
Do	do		[b]0
1900.			
Apr. 14	S. G. Bennett	2.25	[a]22.66
Do	do		[b]0
July 13	S. G. Bennett		[a]22.30
Do	do		[b]0.0
Nov. 20	do	[c]1.70	[a]102.00
Do	do		[b]0.0
1901.			
Feb. 5	S. G. Bennett	1.65	[d]101.00
Feb. 23	do	1.80	[d]110.00
Mar. 4	do	1.70	[d]102.00
Mar. 30	do	1.35	[a]40.60
Do	do		[b]3.40
	Total		44.00
July 6	S. G. Bennett	1.15	[a]26.10
Do	do		[b]13.20
	Total		39.30
Do	S. G. Bennett		[e]36.90
			[f]1.40
	Total		35.50
			[g]3.80
Aug. 20	S. G. Bennett	1.24	[a]30.78
Do	do		[b]0.0

[a] River.
[b] Canal.
[c] Old rod.
[d] Total flow.
[e] Total for canals at mouth of canyon, including tunnel water.
[f] Less tunnel water.
[g] Loss from Warm Spring to mouth of canyon.

Discharge measurements of Santa Ana River and Canal, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec-feet.*
Oct. 8	S. G. Bennett	1.25	[a] 32.00
Do	do		[b] 13.20
	Total		45.20
Dec. 5	S. G. Bennett	1.03	[a] 14.00
Do	do		[b] 9.70
	Total		23.70
1902.			
Apr. 5	S. G. Bennett	1.39	[a] 51.00
Do	do		[b] 4.20
	Total		55.20
May 31	S. G. Bennett	.91	[a] 8.30
Do	do		[b] 20.70
	Total		29.00
July 10	S. G. Bennett	.84	[a] 5.00
Do	do		[b] 18.50
	Total		23.50
Sept. 3	W. B. Clapp	.95	[a] 10.00
Do	do		[b] 14.20
	Total		24.20
Nov. 5	S. G. Bennett	.87	[a] 5.30
Do	do		[b] 12.70
	Total		18.00

[a] River. [b] Canal.

Discharge measurements of Santa Ana River at Warm Spring, San Bernardino County.

Date.	Hydrographer.	Gage height.	Discharge.
1896.		*Feet.*	*Sec.-feet.*
June 20	J. B. Lippincott		61.77
July 28	J. H. Quinton		59.72
Nov. 21	J. B. Lippincott		31.68
1897.			
Jan. 27	J. B. Lippincott		43.58
Mar. 4	do		100.70
June 15	do	1.15	63.74
July 1	A. Q. Campbell	1.20	72.29
July 6	do	1.11	60.35
Aug. 8	do	1.32	56.28
Sept. 30	do	1.13	42.53
Nov. 14	do	1.25	39.92
1898.			
Jan. 8	A. Q. Campbell	1.00	25.56
Mar. 9	H. Crowe	1.05	43.78
Apr. 11	J. B. Lippincott	.98	31.61
Apr. 29	do	.90	29.69
June 12	do	1.10	35.14
July 23	do	1.10	42.22
Sept. 8	do	1.05	35.01
Oct. 18	F. H. Olmsted	.95	22.78
Nov. 9	do	1.10	21.78
Dec. 8	do	1.13	24.74
1899.			
Jan. 12	S. G. Bennett	1.07	38.00
Feb. 18	do	[a]2.16	28.04
Mar. 23	do	2.30	29.62
May 6	do	2.45	25.84
May 31	do	2.27	21.00
June 15	do	2.21	19.60
July 15	do	2.30	25.90
July 27	do	2.30	23.55
Aug. 24	do	1.85	10.86
1900.			
Apr. 14	S. G. Bennett	2.25	22.66
May 5	do	2.20	24.40
July 13	do		22.34
Nov. 20	do	[b]1.70	102.40
Nov. 22	do		[c]15.64

[a] New rod. [b] Old rod. [c] Calculated.

Discharge measurements of Santa Ana River at Warm Spring, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Mar. 4	S. G. Bennett	1.70	102.20
Mar. 30	do	1.35	40.60
Feb. 5	do	1.65	101.00
Feb. 23	do	1.80	110.00
July 6	do	1.15	26.11
Aug. 20	do	1.24	30.78
Oct. 8	do	1.25	32.00
Dec. 5	S. G. Bennett	1.03	14.0
1902.			
May 31	S. G. Bennett	.91	8.3
July 10	do	.84	5.0
Sept. 3	W. B. Clapp	.95	10.0
Nov. 5	S. G. Bennett	.87	5.3

Discharge measurements of Santa Ana River, Alsetrez ditch, in vicinity of Colton and Riverside, San Bernardino and Riverside counties.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
Oct. 25	K. Sanborn	1.53
1902.		
Sept. 29	K. Sanborn	1.96

Discharge measurements of Evans lower ditch, Riverside County.

Date.	Hydrographer.	Discharge.
1898.		*Sec.-feet.*
June 19	F. H. Olmsted	5.68
Aug. 28	do	4.87
1899.		
Aug. 30	S. G. Bennett	4.48
1900.		
July 27	S. G. Bennett	5.27
Oct. 25	K. Sanborn	4.36
1902.		
Sept. 29	K. Sanborn	5.35

Discharge measurements of Evans upper ditch, Riverside County.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
July 27	S. G. Bennett	1.04
Oct. 25	K. Sanborn	3.32
1901.		
Aug. 30	J. B. Lippincott	1.88
1902.		
Sept. 29	K. Sanborn	[a] 2.17
Sept. 29	do	[b] .53

[a] At north line Riverside County. [b] One mile south of north line Riverside County.

Estimated monthly discharge of Santa Ana River at Warm Spring, San Bernardino County, exclusive of Santa Ana canal.

[Drainage area, 188 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1896.	*Second-feet.*	*Second-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
July	76	48	63	3,891	0.34	0.39
August	83	33	57	3,492	.30	.35
September	77	27	55	3,289	.29	.32
October	170	38	55	3,387	.29	.33
November	52	30	[a] 33	1,939	.17	.19
December	40	33	[a] 35	2,176	.19	.22
1897.						
January	101	27	62	3,836	0.33	0.38
February	580	72	181	10,060	.96	1.00
March	460	64	119	7,317	.63	.72
April	186	101	146	8,675	.78	.87
May	101	29	61	3,769	.33	.38
June	67	57	63	3,737	.33	.37
July	85	57	67	4,119	.36	.41
August	80	34	57	3,505	.30	.35
September	61	38	47	2,779	.25	.28
October	250	25	42	2,582	.22	.25
November	52	34	[a] 38	2,261	.20	.22
December	30	22	[a] 26	1,610	.14	.16
The year	580	22	76	54,250	.40	5.39

[a] The reduced flow of November and December is due to closing the Bear Valley dam.

Estimated monthly discharge of Santa Ana River at Warm Spring, San Bernardino County, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1898.	*Second-feet.*	*Second-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	58	33	40	2,460	0.21	0.24
February	76	33	40	2,221	.21	.22
March	40	25	32	1,968	.17	.20
April	34	28	31	1,845	.16	.18
May	149	26	55	3,382	.29	.33
June	58	36	44	2,618	.23	.26
July	53	33	41	2,521	.22	.25
August	58	33	41	2,521	.22	.25
September	45	28	36	2,142	.19	.21
October	36	19	26	1,599	.14	.16
November	34	18	22	1,309	.12	.13
December	28	22	22	1,353	.12	.14
The year	149	18	36	25,939	.19	2.57
1901.						
January	600	31	78	4,796	0.41	0.47
February	540	48	194	10,774	1.03	1.07
March	114	45	68	4,181	.36	.41
April	107	39	43	2,559	.23	.26
May	68	35	42	2,582	.22	.25
June	44	30	37	2,202	.20	.22
July	42	34	38	2,337	.20	.23
August	200	31	50	3,074	.27	.31
September	60	42	49	2,916	.26	.29
October	96	24	48	2,951	.26	.30
November	36	22	26	1,547	.14	.16
December	25	21	24	1,476	.13	.15
The year	600	21	58	41,395	.31	4.12

Estimated monthly discharge of Santa Ana canal at Warm Spring, San Bernardino County.

[Drainage area, 188 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1896.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
July	----------	----------	14	861	0.07	0.08
August	----------	----------	14	861	.07	.08
September	----------	----------	14	833	.07	.08
October	----------	----------	16	984	.09	.10
November	----------	----------	3.5	2,083	.02	.02
December	----------	----------	4.2	2,582	.02	.02
1897.						
January	8.5	3.2	5.6	344	0.03	0.03
February	6	0	4	222	.02	.02
March	6	.5	5.2	320	.03	.03
April	12	0	3.8	226	.02	.02
May	20	0	15	922	.08	.09
June	19	0	16.6	988	.09	.10
July	18.5	10.6	15.6	960	.08	.09
August	20	17.4	18.3	1,125	.10	.12
September	----------	----------	20	1,190	.11	.12
October	----------	----------	12.4	762	.07	.08
November	----------	----------	7	417	.04	.04
December	----------	----------	7	430	.04	.04
The year	----------	----------	10.9	7,906	.06	.78
1898.						
January	----------	----------	9	553	0.05	0.06
February	----------	----------	8	444	.04	.04
March	----------	----------	8	492	.04	.04
April	----------	----------	8	476	.04	.04
May	----------	----------	6	369	.03	.03
June	----------	----------	4	258	.02	.02
July	----------	----------	2	123	.01	.01
August	----------	----------	2	123	.01	.01
September	----------	----------	2	119	.01	.01
October	----------	----------	0	0	0	0
November	----------	----------	0	0	0	0
December	----------	----------	0	0	0	0
The year	----------	----------	4	2,937	.02	.26
1901.						
March	6	0	2.71	167	0.01	0.01
April	4.62	0	2.34	139	.01	.01
May	4.62	3.8	3.96	243	.01	.01

Estimated monthly discharge of Santa Ana River and canals at Warm Spring, San Bernardino County,[a]

[Drainage area, 188 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1896.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
July			77	4,753	0.41	0.47
August			71	4,353	.38	.44
September			69	4,124	.37	.41
October			71	4,372	.38	.44
November			37	2,148	.19	.21
December			39	2,435	.21	.24
1897.						
January	104	35	68	4,179	0.36	0.41
February	585	77	185	10,282	.98	1.02
March	465	70	124	7,637	.66	.76
April	190	113	150	8,899	.80	.89
May	113	48	76	4,690	.41	.47
June	86	60	80	4,723	.42	.47
July	102	70	83	5,077	.44	.51
August	100	54	75	4,628	.40	.46
September	81	58	67	3,968	.35	.39
October	270	45	54	3,347	.29	.33
November	59	40	45	2,678	.24	.27
December	38	29	33	2,040	.18	.21
The year	585	29	87	62,148	.46	6.19
1898.						
January			49	2,987	0.26	0.30
February			48	2,688	.26	.27
March			40	2,448	.21	.24
April			39	2,333	.21	.23
May			61	3,727	.32	.37
June			48	2,840	.25	.28
July			43	2,625	.23	.26
August			43	2,653	.23	.26
September			38	2,223	.20	.22
October			26	1,581	.14	.16
November			22	1,285	.12	.13
December			22	1,364	.12	.14
The year			40	28,754	.21	2.86

[a] Total flow.

Estimated monthly discharge of Santa Ana River and canals at Warm Spring, San Bernardino County—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	34	22	26	1,593	0.14	0.16
February	34	27	27	1,516	.15	.15
March	48	24	32	1,949	.17	.19
April	34	22	25	1,458	.13	.15
May	27	19	22	1,365	.12	.14
June	34	19	22	1,315	.12	.13
July	29	19	22	1,371	.12	.14
August	19	11	13	782	.07	.08
September	12	10	12	690	.06	.07
October	19	12	17	1,015	.09	.10
November	49	17	21	1,268	.11	.13
December	36	18	23	1,427	.12	.14
The year	49	10	22	15,749	.12	1.58
1900.						
January	36	19	23	1,414	0.12	0.14
February	23	20	22	1,222	.12	.12
March	28	20	23	1,414	.12	.14
April	43	19	25	1,488	.13	.14
May	250	20	57	3,505	.30	.35
June	25	19	22	1,309	.12	.13
July	25	11	19	1,168	.10	.12
August	12	9	11	676	.06	.07
September	16	11	12	714	.06	.07
October	16	12	14	861	.07	.08
November	1,564	14	107	6,367	.57	.63
December	31	25	28	1,722	.15	.17
The year	1,564	9	30	21,860	.16	2.16

Estimated monthly discharge of Santa Ana River and canals at Warm Spring, San Bernardino County—Continued.

Month.	Discharge			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	600	31	78	4,796	0.41	0.47
February	540	48	194	10,774	1.03	1.07
March	114	45	68	4,181	.36	.41
April	107	39	43	2,559	.23	.26
May	68	35	42	2,582	.22	.25
June	44	30	37	2,202	.20	.22
July	42	34	38	2,337	.20	.23
August	200	31	50	3,074	.27	.31
September	60	42	49	2,916	.26	.29
October	96	24	48	2,951	.26	.30
November	36	22	26	1,547	.14	.16
December	25	21	24	1,476	.13	.15
The year	600	21	58	41,395	.31	4.12
1902.						
January	45	20	24	1,476	0.13	0.15
February	240	20	38	2,110	.21	.22
March	485	41	79	4,858	.43	.50
April	71	43	51	3,035	.28	.31
May	45	31	36	2,214	.20	.23
June	47	23	33	1,964	.18	.20
July	32	23	26	1,599	.14	.16
August	30	22	25	1,537	.14	.16
September	29	22	24	1,428	.13	.15
October	55	30	40	2,460	.22	.25
November	43	19	24	1,428	.13	.15
December	27	19	22	1,353	.12	.14
The year	485	19	35	25,462	.19	2.62

Discharge measurements of Santa Ana River at head of Gage canal.[a]

Date.	Hydrographer.	Discharge.
		Sec-feet.
1888.[b]	W. Irwin	2,000.00
1898.		
June 29	J. B. Lippincott	1.16
June 30	do	27.42
Sept. 21	do	25 66

[a] See San Bernardino Valley, Gage canal.
[b] Flood. Since that time floods as great as 4,000 second-feet have been observed.

Discharge measurements of Jurupa Canal.

Date.	Hydrographer.	Discharge.
1898.		*Sec-feet.*
June 18	F. H. Olmsted	13.83
July 1	J. B. Lippincott and K. Sanborn	7.11
Aug. 27	F. H. Olmsted	10.18
Sept. 22	J. B. Lippincott	5.41
May 31	S. G. Bennett	6.74
July 15	do	13.14
1899.		
Aug. 24	S. G. Bennett	[a] 4.28
July 26	do	[a] 5.11
1900.		
July 27	G. S. Bennett	14.42
Oct. 19	K. Sanborn	14.05

[a] Submerged flume above Colton bridge.

Discharge measurement of Santa Ana River below Jurupa ditch.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
June 17, 1898	F. H. Olmsted	9.74

Discharge measurements of Santa Ana River below Roubidoux, Evans Upper, and Trujillo ditches.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
July 27, 1900	S. G. Bennett	0.44
Oct. 25, 1900	K. Sanborn	.56

Discharge measurements of Santa Ana River in vicinity of Colton and Riverside, San Bernardino and Riverside Counties.

RIVERSIDE WATER COMPANY'S LOWER CANAL.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
June —, 1898	K. Sanborn	10.27
Sept. —, 1898	do	7.70
Mar. —, 1899	do	16.20
June —, 1899	do	9.09
Aug. —, 1899	do	7.38
Mar. —, 1900	do	8.00
June —, 1900	K. Sanborn	7.16
Sept. —, 1900	do	6.69
June 17, 1898	F. H. Olmsted	9.27
June 18, 1898	do	11.27
		[a] 10.27
July 27, 1900	S. G. Bennett	7.13
Aug. 30, 1901	J. B. Lippincott	[b] 4.52
Sept. 30, 1902	K. Sanborn	3.07

RIVERSIDE WATER COMPANY'S UPPER CANAL.[c]

Aug. 30, 1899	S. G. Bennett	[d] 57.4
July 26, 1900	do	[d] 43.3

ROUBIDOUX DITCH.

June 19, 1898	F. H. Olmsted	8.94
Aug. 28, 1898	do	8.50
July 27, 1900	S. G. Bennett	8.18
Oct. 25, 1900	K. Sanborn	7.80
Aug. 30, 1901	J. B. Lippincott	8.75
Sept. 30, 1902	K. Sanborn	7.19

SANTA ANA RIVER 1½ MILES BELOW INTAKE OF RIVERSIDE WATER COMPANY'S LOWER CANAL.

Aug. 27, 1898	F. H. Olmsted	0.50

[a] Mean for June 17 and 18.

[b] One-fourth of a mile below headworks; 0.4 second-feet wasted below point of measurement into river for Roubidoux Canal.

[c] See also Riverside Water Company's upper canal, under San Bernardino Valley.

[d] In flume above tunnel near Riverside Mesa.

Discharge measurements of Santa Ana River in vicinity of Colton and Riverside, etc.—Continued.

SPRING BROOK BELOW WEST RIVERSIDE BRIDGE.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
June 19, 1898	F. H. Olmsted	2.92
Aug. 28, 1898	do	1.27
July 28, 1900	S. G. Bennett	2.77
Aug. 30, 1901	J. B. Lippincott	2.08
Aug. 28, 1898	F. H. Olmsted	[a]3.85
Oct. 25, 1900	K. Sanborn	[a]8.45

SANTA ANA RIVER BELOW WEST RIVERSIDE BRIDGE.

July 30, 1900	S. G. Bennett	1.16
Aug. 30, 1901	J. B. Lippincott	1.19

SANTA ANA RIVER AT GALLIGERS FORD, 2 MILES BELOW WEST RIVERSIDE BRIDGE.

Aug. 30, 1899	S. G. Bennett	5.6

[a] Santa Ana River, West Riverside Bridge.

Discharge measurements of Trujillo ditch, tributary to Santa Ana.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
July 27, 1900	S. G. Bennett	0.46
Oct. 25, 1900	K. Sanborn	.53

Discharge measurement of Santa Ana River 1,000 feet below Roubidoux ditch intake.

Date.	Hydrographer.	Discharge.
		Sec. feet.
Oct. 25, 1900	K. Sanborn	0.56

Discharge measurements of Santa Ana River in vicinity of Rincon, Riverside County.

ANAHEIM UNION CANAL.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
June 22, 1898	F. H. Olmsted	34.74	5 miles below division box.
Sept. 15, 1899	J. B. Lippincott	27.92	
Oct. 26, 1899	do	17.14	1 mile below Esperanza.
Aug. 15, 1900	W. P. Searcy	18.37	
Sept. 3, 1900	do	18.22	
Aug. 31, 1901	do	23.11	

SANTA ANA RIVER AT AUBURNDALE BRIDGE.

July 17, 1888	F. C. Finkle	14.6	
Aug. 22, 1888	do	13.3	
Sept. 15, 1888	do	14.2	
Aug. 14, 1889	do	15.6	
Sept. 28, 1889	do	16.7	
Aug. 13, 1890	do	22.3	
Sept. 10, 1891	do	25.6	
Sept. 11, 1892	do	43.4	
June 21, 1898	F. H. Olmsted	60.00	Including ditches.
Aug. 30, 1899	S. G. Bennett	53.10	Do.
Sept. 12, 1899	J. B. Lippincott	59.83	
July 28, 1900	S. G. Bennett	54.45	Do.
Oct. 5, 1900	W. W. Cockins, jr	69.70	Do.
Aug. 27, 1901	J. B. Lippincott	43.70	Above Roberts ditch.
Aug. 31, 1901	do	28.54	Do.

CASTILLO DITCH BELOW RIVERSIDE NARROWS.

Aug. 30, 1901	J. B. Lippincott	1.19	

CHINO CREEK NEAR RINCON.

Aug. 30, 1898	F. H. Olmsted	4.95	
May 2, 1899	F. Rolfe	12.79	
May 15, 1899	do	8.64	
June 3, 1899	do	17.02	
June 15, 1899	do	5.63	
July 4, 1899	do	3.02	
July 17, 1899	do	4.68	

Discharge measurements of Santa Ana River in vicinity of Rincon, etc.—Cont'd.

CHINO CREEK NEAR RINCON—continued.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Aug. 1, 1899	F. Rolfe	7.49	
Aug. 15, 1899	do	2.14	
Aug. 31, 1899	do	3.19	
Sept. 13, 1899	J. B. Lippincott	3.53	
Oct. 25, 1899	do	14.52	
Apr. 17, 1900	W. P. Searcy	8.79	
June 24, 1900	do	3.97	
July 7, 1900	do	2.09	
July 28, 1900	S. G. Bennett	2.20	
Aug. 15, 1900	W. P. Searcy	1.08	
Sept. 3, 1900	do	0.0	
Oct. 5, 1900	W. W. Cockins, jr	5.00	
Aug. 31, 1901	J. B. Lippincott	2.80	

DIVISION BOX SANTA ANA AND ANAHEIM CANALS.

June 22, 1898	F. H. Olmsted	67.5	
Aug. 30, 1898	do	52.9	
Aug. 30, 1899	S. G. Bennett	59.6	
Sept. 15, 1899	J. B. Lippincott	71.7	
Oct. 25, 1899	do	144.7	
July 28, 1900	S. G. Bennett	49.7	
Oct. 5, 1900	W. W. Cockins, jr	75.1	
Aug. 27, 1901	J. B. Lippincott	64.5	
Aug. 31, 1901	do	55.4	

DURKEE DITCH.

Sept. 3, 1899	J. B. Lippincott	1.38	Near ranch house.
Sept. 13, 1899	do	6.14	Newberry east line.
July 28, 1900	S. G. Bennett	1.80	At ranch house.
Aug. 27. 1901	J. B. Lippincott	3.98	
Aug. 31, 1901	do	8.24	

SANTA ANA RIVER, OPPOSITE ESPERANZA STATION.

Oct. 26, 1899	J. B. Lippincott	49.2	

Discharge measurements of Santa Ana River in vicinity of Rincon, etc.—Cont'd.

FULLER DITCH.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
July 28, 1900		13.00	Said by Fuller to be carrying this amount at intake.
Oct. 5, 1900	W. W. Cockins, jr	6.50	
Aug. 30, 1901	J. B. Lippincott	9.69	Near intake.
Do	do	7.15	At Fuller's ranch house.

SANTA ANA RIVER, ABOVE FULLER'S DITCH.

Aug. 30, 1901	J. B. Lippincott	24.34	Intake.

GILLILAND'S DITCH, AUBURNDALE BRIDGE.

July 28, 1900	S. G. Bennett	1.40	

Discharge measurement of Santa Ana River, Newberry's east line.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Aug. 31, 1901	J. B. Lippincott	40.7	

Discharge measurements of Newberry ditch.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
July 28, 1900	S. G. Bennett	5.47	At Auburndale bridge.
Aug. 27, 1901	J. B. Lippincott	3.05	At head.
Aug. 31, 1901	do	3.23	Do.

Discharge measurement of Newton ditch, below Narrows.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Aug. 30, 1901	J. B. Lippincott	7.04	

Discharge measurements of Santa Ana River 1 mile below railroad bridge, Rincon, Cal.

Date.	Hydrographer.	Discharge.	Remarks.
1898.		*Sec.-feet.*	
June 21	F. H. Olmsted	[a] 79.81	
Do	do	[b] 3.18	
	Total	82.99	
Aug. 29	F. H. Olmsted	[a] 62.67	
Do	do	[b] 4.15	
	Total	66.82	
1899.			
Jan. 3	S. G. Bennett	[a] 209.4	
Do	do	[b] 2.3	
	Total	211.7	
Jan. 16	F. Rolfe	231.9	
Jan. 28	do	[a] 216.0	
Do	do	[b] 6.5	
	Total	222.5	
Feb. 15	F. Rolfe	[a] 181.0	
Do	do	[c] 1.75	
	Total	182.75	
Mar. 4	F. Rolfe ... total	108.6	
Mar. 18	do ... do	199.89	
Apr. 6	do	172.23	
	Total	480.72	
April 18	F. Rolfe	[a] 101.10	One mile below railroad bridge.
Do	do	[b] 2.75	
	Total	103.85	
May 2	F. Rolfe	[a] 100.34	
Do	do	[b] 2.45	
	Total	102.79	
May 15	F. Rolfe	[a] 100.36	
Do	do	[b] 3.95	
	Total	104.31	

[a] River. [b] Ditch. [c] Canal.

Discharge measurements of Santa Ana River, etc.—Continued.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
June 3	F. Rolfe	[a] 110.27	
Do	do	[b] 3.18	
	Total	113.45	
June 15	F. Rolfe	[a] 84.43	
Do	do	[b] 1.94	
	Total	86.37	
July 4	F. Rolfe	[a] 68.89	
Do	do	[b] 2.42	
	Total	71.31	
July 16	S. G. Bennett and F. Rolfe.	[a] 101.41	
Do	do	[b] 1.89	
	Total	103.30	
Do	S. G. Bennett and F. Rolfe.	[a] 87.89	
Do	do	[b] 1.65	
	Total	89.54	
July 18	F. Rolfe	[a] 64.13	One mile below railroad bridge.
Do	do	[b] 1.54	
	Total	65.67	
Aug. 1	F. Rolfe	[a] 57.82	
Do	do	[b] 3.44	
	Total	61.26	
Aug. 15	F. Rolfe	[a] 64.71	
Do	do	[b] 3.16	
	Total	67.87	
Aug. 30	F. Rolfe	[a] 65.90	
Do	do	[b] 2.00	
	Total	67.90	
Aug. 31	F. Rolfe	[a] 68.02	Do.
Do	do	[b] 3.06	
	Total	71.08	
Sept. 13 1900.	J. B. Lippincott	[a] 72.73	Do.
Apr. 16	S. G. Bennett	90.86	Do.

[a] River. [b] Ditch.

Discharge measurements of Santa Ana River at Rincon wagon bridge.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
Sept. 13	J. B. Lippincott	72.58
Oct. 25	do	130.32
Oct. 26	do	146.53
Dec. 28	do	165.05
1900.		
Apr. 17	W. P. Searcy	101.60
June 24	do	69.20
July 7	do	84.47
July 28	S. G. Bennett	60.76
Aug. 15	W. P. Searcy	87.10
Sept. 3	do	88.20
Oct. 5	W. W. Cockins, jr	74.20
1901.		
Aug. 27	J. B. Lippincott	78.60
Aug. 31	do	65.30
1902.		
Sept. 2	W. B. Clapp	74.90

Discharge measurements of Santa Ana River at Riverside Narrows.

Date.	Hydrographer.	Discharge.
1888.		*Sec.-feet.*
July 16	F. C. Finkle	10.1
July 17	do	10.5
Aug. 21	do	8.5
Sept. 14	do	9.5
1889.		
Aug. 13	do	11.0
Sept. 27	do	11.2
1890.		
Aug. 12	do	18.8
1901.		
Sept. 9	do	15.5
1892.		
Sept. 10	do	29.4

Discharge measurements of Santa Ana River at Riverside Narrows—Continued.

Date.	Hydrographer.	Discharge.
1898.		*Sec.-feet.*
June 20	F. H. Olmsted	47.63
Aug. 29	do	39.05
1899.		
July 17	F. Rolfe	31.70
Sept. 9	J. B. Lippincott	39.69
1900.		
July 27	S. G. Bennett	38.41
Oct. 25	K. Sanborne	70.64
1901.		
Aug. 30	J. B. Lippincott	33.87
1902.		
Oct. 10	K. Sanborne	43.25

Discharge measurements of canals and ditches of Santa Ana River system near Rincon, Riverside County.

DITCH ON RIGHT BANK OF SANTA ANA RIVER 3 MILES BELOW RIVERSIDE NARROWS.

Date.	Hydrographer.	Discharge.
1898.		*Sec.-feet.*
June 20	F. H. Olmsted	3.75

DITCH ON RIGHT BANK OF SANTA ANA RIVER 5 MILES BELOW RIVERSIDE NARROWS, ON GRIFFITH'S PLACE.

June 20	F. H. Olmsted	9.99

ROBERTS DITCH.

1901.		
Aug. 27	J. B. Lippincott	0
Aug. 31	do	0

Discharge measurements of canals and ditches, etc.—Continued.

SANTA ANA VALLEY IRRIGATION COMPANY'S CANAL, ORANGE COUNTY, CAL.

Date.	Hydrographer.	Discharge.
1898.		*Sec.-feet.*
June 22	F. H. Olmsted	[a] 28.99
Aug. 30	do	[a] 24.62
1899.		
May 26	F. Rolfe	[b] 43.98
Sept. 15	J. B. Lippincott	30.26
Oct. 26	do	[c] 47.19
1900.		
Sept. 3	W. P. Searcy	38.99
Aug. 15	do	25.71
1901.		
Aug. 31	J. B. Lippincott	[d] 18.30

SEECHER DITCH, AT RINCON BRIDGE.

1901.		
June 24	W. P. Searcy	.62

TOWNSEND DITCH.

1898.		
June 20	F. H. Olmsted	4.80
1900.		
Oct. 5	W. W. Cockins, jr	5.84

WILBUR DITCH.

1901.		
Aug. 30	J. B. Lippincott	4.52

YORBA DITCH.

1899.		
Oct. 26	J. B. Lippincott	8.88
1900.		
Aug. 15	W. P. Searcy	14.00
Sept. 3	do	21.45
1901.		
Aug. 31	J. B. Lippincott	[e] .40

[a] Near bridge to Yorba.
[b] Three miles above Olive.
[c] First road crossing.
[d] At road crossing at head of cement lining.
[e] Estimated above drop from Anaheim ditch and opposite Esperanza.

Miscellaneous low-water measurements made in watershed of Santa Ana River, Los Angeles, San Bernardino, Riverside, and Orange counties.

Date.	Locality.	Area of section.	Mean velocity.	Discharge.
1900.		*Sq. feet.*	*Feet per sec.*	*Sec.-feet.*
Sept. 25	Frey's ranch, near Spadra	0.80	2.312	1.85
Do	Phillips's ranch, near Spadra (weir)			.74
Sept. 27	C. L. Lancaster, Mesa avenue, Lordsburg (weir)			.559
Sept. 26	Covina Irrigation Co. compressor pumping plant, south of Lordsburg			3.58
Sept. 24	Neuruff place, corner Holt avenue and San Antonio avenue, Pomona (weir)			.33
Sept. 26	Pomona Land and Water Co., Garey avenue (weir)			1.28
Sept. 26	Consolidated Water Co.'s Pomona air-compressor plant (weir)			3.34
Sept. 24	Consolidated Water Co., north of Pomona College (weir)			.82
Sept. 25	James Warden's place (weir)			.25
Sept. 24	Brundege place, San Antonio avenue, Pomona	.25	1.04	.26
Sept. 25	Del Monte Water Co. (weir)			.96
Do	San Antonio Water Co.'s wells in Claremont; water goes to Ontario (weir)			.40
Do	San Antonio Water Co.'s wells at Indian Hill, ½ mile north of Pomona College (weir)			.99
Do	San Antonio Canyon. From records of Pomona Land and Water Co. The discharge from San Antonio Canyon was 7.53 second-feet Sept. 2, 1895, and 9.02 second-feet on Sept. 6, 1897 (weir).[a]			3.72
	RED HILL, CUCAMONGA.			
July 11	Cucamonga Land and Water Co., Cucamonga Creek, 30-inch pipe line (weir)			1.15
Do	Cucamonga Land and Water Co., Lone Star Spring pumping plant (weir)			1.20
Do	Cucamonga Land and Water Co., "Y" tunnel (weir)			1.68
Do	Stowell water from 90-acre tract; west side part to Ontario (weir)			2.97
Do	San Antonio Water Co., Haskell well (weir)			2.13
Do	San Antonio Water Co., Sixteenth street, pumping plant (weir)			1.72
	Total			10.85

[a] July 11, 1900, measurement made of water in San Antonio Canyon by S. G. Bennett; discharge, 4.07 second-feet.

Miscellaneous low-water measurements made, etc.—Continued.

Date.	Locality.	Area of section.	Mean velocity.	Discharge.
1900.	RED HILL, CUCAMONGA—continued.			
July 11	Natural surface flow of Cucamonga Creek in canyon (Iomosa Water Co.)	*Sq. feet.* 0.22	*Feet per sec.* 4.10	*Sec.-feet.* 0.90
	Developed by bed-rock tunnel			.18
	Total			1.08
Aug. 4	Cucamonga Land and Water Co., Lone Star Spring pumping plant (weir)			1.02
June 8	Lytle Creek at intake of Rialto Canal (weir)			6.19
Sept. 29	do			4.62
June 8	Cajon Creek Canyon in flume, opposite Keenbrook station	1.49	.92	1.37
July 12	West Twin Creek in flume	.084	2.66	.22
Oct. 1	do			.16
July 12	East Twin Creek, Del Rosa cement canal	.40	1.55	.62
Oct. 1	do			.36
July 12	East Twin Creek, Kansas City Syndicate development	.44	3.45	.15
Oct. 1	do			.17
July 12	City Creek measurement in cement canal	.32	.50	.16
Oct. 1	City Creek, at head of pipe line	.24	.88	.21
July 12	Plunge Creek at intake of ditch (weir)			.34
July 13	Below wasteway of Santa Ana Canal	9.29	2.404	22.34
Do	South Fork or Redlands Canal, water not going over weir into North Fork or Highlands Canal on account of repairs (weir)			10.65
Do	Redlands tunnel (weir)			.84
Do	Morton Canyon (weir)			.09
Oct. 2	South Fork or Redlands Canal (weir)			6.25
Do	North Fork or Highlands Canal (weir)			5.61
Do	Green Spot pipe line (weir)			.12
Do	Redlands tunnel (weir)			.85
Do	Morton Canyon (weir)			.20
July 13	Water in Mill Creek zanja (weir)			5.35
Do	Mill Creek. Water is being pumped by Crafton Water Co. et al. in Mill Creek Canyon and Yucipe Valley (weir)			3.44
	Total			8.79

Miscellaneous low-water measurements made, etc.—Continued.

Date.	Locality.	Area of section.	Mean velocity.	Discharge.
1900.	RED HILL, CUCAMONGA—continued.			
Oct. 2	Crafton Water Co.'s pumping plant, Mill Creek Canyon (weir)	*Sq. feet.*	*Feet per sec.*	*Sec.-feet.* 1.35
Do	At mouth of Mill Creek Canyon (weir)			7.21
	Total			8.56
July 14	San Timoteo Canyon ditch at Bicknell Station	1.00	1.50	1.50
June —	Haws & Talmadge			.00
June —	Rabel ditch			.35
June —	Shay ditch			.40
June —	McKenzie ditch			1.57
June —	Meeks & Daley ditch			13.78
June —	Beams ditch			.50
June —	Riverside Water Co., upper canal			52.94
June —	Riverside Water Co., lower canal			7.16
June —	Timber ditch			.00
June —	Gage Canal, Santa Ana River			.29
June —	Gage Canal, Palm avenue			22.52
June —	Logsdon & Farrel ditch			.49
June —	Whitlock ditch			.00
June —	Daley ditch			1.12
June —	McIntyre ditch			.01
June —	Whiting ditch			.13
June —	Swamp ditch			.89
June —	Ranchero ditch			.55
June —	Ward & Warren ditch			1.70
June —	Mill flume, Riverside Water Co			2.17
June —	Mill pump, Riverside Water Co			1.88
June —	Camp Carlton ditch			2.60
June —	East Riverside ditch			5.38
June —	Colton Terrace Water Co			1.54
June —	City of Colton			3.21
June —	Bloomington flume			3.68
July 26	Riverside Water Co.'s upper canal in flume 150 feet above tunnel Riverside Mesa	17.48	2.477	43.30
July 27	North Riverside and Jurupa Canal in flume near Beckstead's house	6.94	2.077	14.42
July 27	Riverside Water Co.'s lower canal	3.35	2.128	7.13
July 27	Roubidoux ditch	6.21	1.317	8.18
July 27	Trujillo ditch	.75	.61	.46

Miscellaneous low-water measurements made, etc.—Continued.

Date.	Locality.	Area of section.	Mean velocity.	Discharge.
1900.	RED HILL, CUCAMONGA—continued.	*Sq. feet.*	*Feet per sec.*	*Sec.-feet.*
July 27	75 feet below intake of Trujillo ditch	0.38	1.17	0.44
July 27	Evans upper ditch	.95	1.10	1.04
	Total flow Santa Ana at Roubidoux ditch intake			10.12
July 27	Alsetrez ditch from Spring Brook, 100 feet below West Riverside bridge	1.95	1.42	2.77
July 27	200 feet below West Riverside bridge	1.77	.65	1.16
July 27	West Riverside bridge, Roubidoux Mountain	2.85	1.85	5.27
July 27	At Riverside Narrows	26.54	1.443	38.41
Sept. 13	Riverside Water Co.'s lower canal	3.36	1.99	6.69
Oct. 19	North Riverside and Jurupa canal	6.69	2.10	14.05
Oct. 25	Roubidoux ditch	5.95	1.31	7.80
Oct. 25	Trujillo ditch	1.10	.48	.53
Oct. 25	20 feet below intake of Trujillo ditch	.80	.70	.56
Oct. 25	Evans's upper ditch	2.42	1.37	3.32
	Total			12.21
Oct. 25	Alsetrez ditch from Spring Brook, West Riverside bridge	1.75	.87	1.53
Oct. 25	At West Riverside bridge	5.50	1.54	8.45
Oct. 25	Evans's ditch, West Riverside bridge	2.52	1.75	4.36
Oct. 25	At Riverside Narrows	43.3	1.63	70.64
July 28	300 feet above Auburndale bridge	28.65	1.576	45.16
July 28	Newberry ditch, Auburndale bridge	5.32	1.03	5.47
July 28	Ditch south of Newberry ditch, Auburndale bridge	1.58	1.47	2.32
July 28	Gilliland ditch, Auburndale bridge	1.49	.94	1.40
	Total			54.35
Oct. 5	Auburndale bridge	40.50	1.577	63.9
Oct. 5	Townsend ditch, Auburndale bridge	6.10	.957	5.84
Oct. 5	Fuller's ditch, near schoolhouse	5.10	1.274	6.50
July 28	Rincon bridge	35.55	1.704	60.76
July 28	Chino Creek under bridge, Chino-Corona road	3.66	.60	2.20
Oct. 5	Rincon bridge	43.90	1.69	74.20
Oct. 5	Chino Creek	1.90	2.63	5.00
July 28	Durkee ditch, near ranch house	1.40	1.30	1.80
July 28	At Anaheim and Santa Ana division box	23.64	2.103	49.72
Oct. 5	....do	29.00	2.59	75.10

For tabulation of a large number of water measurements in the San Bernardino Valley above Riverside Narrows and in the basin of the Santa Ana River, see San Bernardino Valley.

SANTA ANA RIVER, MILL CREEK.

See Mill Creek (page 158).

SANTA ANA RIVER, LYTLE CREEK.

See Lytle Creek (page 139).

SANTA ANA RIVER, SAN ROQUE CREEK.

See Arroyo Burro (page 43).

SANTA BARBARA COUNTY.

Miscellaneous measurements of streams east of Santa Barbara City, Santa Barbara County, made in July and August, 1889, by George F. Wright.

Stream.	Discharge.	Area of watershed.
	Sec.-feet.	*Sq. miles.*
Rincon	0.12	10.5
Gubernador	.58	4.2
Carpenteria	.08	44.0
Santa Monica	.23	4.3
Padaro	.31	2.2
Dinsmore	.23	2.2
Cold Stream	.23	3.0
Mission	.46	4.0

Miscellaneous measurements of streams west of Santa Barbara City, Santa Barbara County, made in July and August, 1889, by George F. Wright.

Stream.	Discharge.	Area of watershed.
	Sec.-feet.	*Sq. miles.*
Arroyo Burro	0.23	2.5
Maria Ignacia	.23	16.5
San Jose	.27	.....
San Pedro	.08	3.0
Arroyo Carnero	.08	1.0
Armas	.08	1.0
Tecolote	.27	2.0
Aguilar	.12	2.0
Dos Pueblos	.54	3.25
Canyada Verde	.08	2.00
Canyada Llaces	.08	1.50
El Capitan	.23	1.50
Canyada del Corral	.15	1.00
Canyada Refugio	.31	2.00

Discharge measurements of San Pedro Creek, Santa Barbara County, Cal.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.08	Drainage area, 3 square miles.

Discharge measurements of San Timoteo Creek, Riverside County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
July 14, 1900	S. G. Bennett	1.50	Bicknel station.

Discharge measurements of San Ysidro Creek, Santa Barbara County, Cal., above dam.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Nov. 2, 1899	Greenheld	0.06	
Dec. 3, 1899	do	.15	
Mar. 6, 1900	do	1.00	
Mar. 19, 1900	do	.35	
June 16, 1900	R. Moyer	.07	

SANTA CLARA RIVER.

Discharge measurements of Santa Clara River at point below mouth of San Francisquito Creek, on Newhall ranch, Los Angeles County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Aug. 9, 1898	F. H. Olmsted	10.83	
Aug. 19, 1899	S. G. Bennett	3.38	East channel.
Aug. 19, 1899	do	1.65	West channel.
Aug. 19, 1899	do	3.37	Newhall ditch.
	Total	8.40	
Oct. 8, 1900	W. W. Cockins, jr	3.64	East channel.
Oct. 8, 1900	do	3.25	West channel.
Oct. 8, 1900	do	3.35	Newhall ditch.
	Total	10.24	

Discharge measurements of Santa Clara River at point 2 miles east of Camulos, Ventura County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
June 18, 1898	J. B. Lippincott	25.74	
Aug. 11, 1898	F. H. Olmsted	17.36	
Aug. 19, 1899	S. G. Bennett	17.63	Camulos ditch.
Aug. 19, 1899	do	1.24	River.
	Total	18.87	
Oct. 8, 1900	W. W. Cockins, jr	11.38	Camulos ditch at head of wooden flume.

Discharge measurements of Santa Clara River in Cienega, 1 mile east of Fillmore, Ventura County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Mar. 15, 1899	S. G. Bennett	3.60	

Discharge measurements of Santa Clara River near Santa Paula, Ventura County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Aug. 18, 1899	S. G. Bennett	16.00	Farmers ditch.
Aug. 18, 1899	do	8.60	Grease or Santa Clara ditch.
Aug. 18, 1899	do	5.80	Ditch taken out on east side of river.
Aug. 18, 1899	do	10.30	River.
	Total	40.70	

SANTA MONICA CREEK.

Discharge measurements of Santa Monica Creek, Santa Barbara County.

[Drainage, 4.3 square miles.]

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Aug. —, 1889	G. F. Wright	0.23	¼ mile above Fithian's house.
June 16, 1900	R. Moyer	.11	

SANTA PAULA RIVER.

Discharge measurement of Santa Paula River above Neeper schoolhouse, near Santa Paula, Ventura County, Cal.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. 18, 1899	S. G. Bennett	0.85	

SANTA YNEZ RIVER.

As determined from Geological Survey maps the area of the drainage basin of this stream above Juncal dam site is 13.4 square miles. E. J. S. Purslow stated in a report to the Santa Barbara Water Company in 1896 that the Santa Ynez River at the Juncal reservoir site was measured during the "past winter and spring;" further details are not given. The discharge stated was 800,000,000 gallons=2,455 acre-feet. The rainfall for season at Santa Barbara was 13.77 inches and the mean from 1867 to date is 16.82 inches. The period of stream observations probably extended from November 1, 1895, to July 1, 1896. This includes Alder Creek water below Juncal.

During the winter of 1902–3 the city of Santa Barbara cooperated with the United States Geological Survey in determining the run-off from portions of the drainage basin of the Santa Ynez River, as given below.

Measurements were first made of the main Santa Ynez River above its junction with the Mono tributary. The drainage area above this point is 71 square miles. Measurements were also made of the discharge of the Mono tributary of the Santa Ynez River at its mouth. The drainage area above this point is 119 square miles. Both of these streams flow from the mountains of the Coast Range, the elevations of their basins ranging from 1,400 to 7,000 feet.

The estimated average rainfall in these drainage basins is 22 inches, and during the season of 1902–3 the mean rainfall was probably exceeded by about 2 inches. The precipitation, however, occurred in gentle slow storms until the latter part of March, when there were heavier rains. It is locally stated that the stream flow is not up to the average. This probably could be explained by the fact of the gentle rains referred to above, and to the further fact that the season of 1902–3 was preceded by years of protracted drought.

List of discharge measurements of Santa Ynez River above junction with Mono.

Date.	Hydrographer.	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-feet.*
Jan. 12	Howard Rankin	1.10	1.79
Jan. 25	do	1.10	1.93
Jan. 27	do	1.20	3.30
Jan. 28	do	3.55	457.24
Jan. 29	do	1.70	49.75
Jan. 30	do	1.50	22.45
Jan. 31	do	1.48	17.90
Feb. 1	do	1.50	22.18
Feb. 2	do	1.45	16.01
Feb. 3	do	1.42	14.61
Feb. 4	do	1.45	15.31
Feb. 5	do	1.45	14.92
Feb. 7	do	1.45	15.63
Feb. 8	do	1.58	24.74
Feb. 9	do	1.50	18.38
Feb. 10	do	1.49	17.63
Feb. 11	do	1.46	16.15
Feb. 12	do	1.45	15.54
Feb. 13	do	1.44	14.92
Feb. 14	do	1.44	14.72
Feb. 16	do	1.40	10.85
Feb. 17	do	1.40	11.34
Feb. 18	do	1.40	11.11
Feb. 19	do	1.40	11.05
Feb. 20	do	1.39	10.75
Feb. 21	do	1.39	10.98
Feb. 23	do	1.38	10.11
Feb. 24	do	1.37	9.05
Feb. 25	do	1.37	9.07
Feb. 26	do	1.36	8.58
Feb. 27	do	1.35	8.72
Feb. 28	do	1.35	8.32
Mar. 1	do	1.35	8.16
Mar. 2	do	1.35	8.01
Mar. 3	do	1.35	7.91
Mar. 4	do	1.45	14.78
Mar. 5	do	1.65	31.60
Mar. 6	do	1.50	20.19
Mar. 7	do	1.50	19.95
Mar. 9	do	1.43	13.52
Mar. 10	do	1.42	13.20
Mar. 11	do	1.42	13.42

List of discharge measurements of Santa Ynez River, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-feet.*
Mar. 12	Howard Rankin	1.41	12.70
Mar. 13	do	1.42	13.24
Mar. 14	do	1.43	12.84
Mar. 15	do	1.43	13.11
Mar. 16	do	1.43	12.85
Mar. 17	do	1.42	11.63
Mar. 18	do	1.41	11.27
Mar. 19	do	1.40	11.08
Mar. 20	do	1.40	10.88
Mar. 21	do	1.40	10.55
Mar. 22	do	1.40	10.48
Mar. 23	do	1.40	10.60
Mar. 25	do	1.67	29.26
Mar. 26	do	1.55	19.58
Mar. 27	do	1.50	17.15
Mar. 28	do	1.49	16.91
Mar. 29	do	1.50	18.05

List of discharge measurements of Mono Creek at mouth.

Date.	Hydrographer.	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-feet.*
Jan. 28	Howard Rankin	2.95	295.00
Jan. 29	do	1.55	20.23
Jan. 30	do	1.30	12.51
Jan. 31	do	1.25	9.03
Feb. 1	do	1.35	14.83
Feb. 2	do	1.30	10.12
Feb. 3	do	1.20	6.93
Feb. 4	do	1.28	8.82
Feb. 5	do	1.28	8.25
Feb. 6	do	1.21	8.08
Feb. 8	do	1.35	11.96
Feb. 9	do	1.29	8.81
Feb. 10	do	1.28	8.42
Feb. 11	do	1.27	8.77
Feb. 12	do	1.26	8.23
Feb. 13	do	1.25	7.61
Feb. 14	do	1.20	4.89
Feb. 16	do	1.20	5.10
Feb. 17	do	1.20	5.04

List of discharge measurements of Mono Creek at mouth—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-feet.*
Feb. 18	Howard Rankin	1.20	5.14
Feb. 19	do	1.20	5.17
Feb. 20	do	1.19	4.75
Feb. 21	do	1.19	4.74
Feb. 23	do	1.17	4.65
Feb. 24	do	1.15	4.60
Feb. 25	do	1.15	4.56
Feb. 26	do	1.15	4.45
Feb. 27	do	1.14	3.79
Feb. 28	do	1.14	3.81
Mar. 1	do	1.12	3.61
Mar. 2	do	1.12	3.62
Mar. 3	do	1.12	3.64
Mar. 4	do	1.30	10.99
Mar. 5	do	1.60	25.85
Mar. 6	do	1.37	13.57
Mar. 7	do	1.35	13.28
Mar. 9	do	1.30	9.77
Mar. 10	do	1.25	6.58
Mar. 11	do	1.22	6.32
Mar. 12	do	1.22	6.56
Mar. 13	do	1.22	6.49
Mar. 14	do	1.27	9.22
Mar. 15	do	1.25	7.52
Mar. 16	do	1.30	9.83
Mar. 17	do	1.32	9.94
Mar. 18	do	1.26	8.19
Mar. 19	do	1.25	7.99
Mar. 20	do	1.24	7.08
Mar. 21	do	1.24	7.07
Mar. 22	do	1.23	7.18
Mar. 23	do	1.23	7.17
Mar. 25	do	2.50	153.23
Mar. 26	do	1.90	62.52
Mar. 27	do	1.70	36.27
Mar. 28	do	1.60	26.63
Mar. 29	do	1.61	29.54
Mar. 30	do	2.65	177.46
Mar. 31	do	2.80	227.31
Apr. 1	do	4.50	710.58
Apr. 2	do	3.00	269.83

SAWPIT CREEK.

Discharge measurement of Sawpit Creek at Division Box, Los Angeles County, Cal.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
July 1, 1898	F. H. Olmsted	1.33	Near mouth of canyon.

SESPE CREEK.

Discharge measurements of Sespe Creek, Santa Clara River, Ventura County, Cal.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. 11, 1898	F. H. Olmsted	2.5	
Mar. 15, 1899	S. G. Bennett	8.3	At head of Sespe Land and Water Co. Canal.
Aug. 18, 1899	do	1.9	Do.

SHASTA RIVER.

Discharge measurement of Shasta River.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Aug. —, 1899	M. M. O'Shaughnessy	279	Wagon bridge 1 mile south of Montague railroad station.

SNOW CREEK.

Discharge measurement of Snow Creek, Palm Valley, Riverside County, Cal.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Feb. 22, 1898	J. B. Lippincott	4.5	

SPRING VALLEY WATER COMPANY.

See San Mateo Creek, Water Supply and Irrigation Paper No. 51, page 390.

STANISLAUS RIVER.

The river has its source on the western slope of the Sierra Nevada in California. It drains a country lying between the basins of Mokelumne River on the north and Tuolumne River on the south, and flows in a general southwesterly direction, entering San Joaquin River 23 miles above Stockton. A number of canals divert water from this stream on either side, the principal one being the canal of the Stanislaus and San Joaquin Water Company, which irrigates lands in the vicinity of Oakdale and between Knights Ferry and Stockton.

The canal of the Stanislaus and San Joaquin Water Company diverts water from Stanislaus River at a point 3 miles above Knights Ferry, or approximately 15 miles above Oakdale. The volume of this canal at what is known as section 3, was rated on June 1, 1898, by turning in various amounts of water and measuring the same with a meter. It was found on June 6, 1899, that silt had accumulated in the bottom of the flume at the old gage, and a new station was adopted. This point was rated similarly to the one of the year previous.

The record at this station was discontinued February 16, 1901.

Discharge measurements of Stanislaus River at Oakdale, Stanislaus County.

Date.	Hydrographer.	Gage height.	Discharge.
1895.		*Feet.*	*Sec.-feet.*
May 3	J. B. Lippincott	8.85	7,744
July 1	do	6.17	3,754
Aug. 28	do	2.40	279
Oct. 10	do	2.11	192
Nov. 29	do	2.12	147
1896.			
Apr. 17	J. A. Vogleson	5.40	2,801
July 5	C. C. Babb	4.80	2,061
Sept. 7	H. Crowe	2.50	304
Oct. 29	J. B. Lippincott	2.40	210
1897.			
Feb. 16	J. B. Lippincott	4.22	1,346
June 30	J. B. Lippincott and B. Cole	8.60	6,754
July 14	A. Q. Campbell	3.20	1,015
Sept. 5	do	2.00	144
Oct. 29	do	2.40	223
Dec. 19	J. B. Lippincott	3.00	429

Discharge measurements of Stanislaus River at Oakdale, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1898.		*Feet.*	*Sec.-feet.*
Apr. 17	J. B. Lippincott	5.30	2,203
June 2	do	3.77	912
July 29	do	[a]4.30	73
Oct. 6	do	4.20	50
Dec. 22	do	4.97	362
1899.			
Mar. 3	J. B. Lippincott	5.13	487
Apr. 20	S. G. Bennett	8.80	3,873
May 18	do	7.63	2,634
June 5	do	7.94	3,057
June 8	do	8.42	3,599
June 28	do	6.3	1,167
Aug. 3	do	4.53	143
Sept. 9	do	4.41	88
Dec. 6	J. B. Lippincott	5.41	531
1900.			
Apr. 5	S. G. Bennett	6.82	1,703
May 19	do	9.33	4,515
June 21	do	6.65	1,438
Aug. 11	do	4.38	66
Sept. 6	do	4.25	35
Dec. 28	do	5.66	611
1901.			
Jan. 29	S. G. Bennett	6.18	965
Oct. 21	do	4.78	189
1902.			
Aug. 20	L. M. Lawson	.....	125

[a] New rod set July 20, 1898.

Discharge measurements of Stanislaus River at Parrots Ferry.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
Sept. 13	S. G. Bennett	70

Estimated monthly discharge of Stanislaus River at Oakdale, Stanislaus County. [a]

[Drainage area, 1,051 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November [b]			42	2,499	0.04	0.04
December [b]			42	2,582	.04	.05
1879.						
January [b]			525	32,281	.50	.58
February	9,830	350	1,994	110,741	1.89	1.97
March	6,960		4,523	278,108	4.30	4.96
April	7,390	3,260	4,307	256,284	4.09	4.56
May	6,060	2,950	4,098	251,976	3.90	4.50
June	6,720	3,160	4,387	261,044	4.17	4.65
July	2,230	1,320	1,584	97,396	1.51	1.74
August [b]			126	7,747	.12	.14
September [b]			21	1,249	.02	.02
October [b]			21	1,291	.02	.02
November [b]			74	4,403	.07	.08
December [b]			630	38,737	.60	.69
The year			1,858	1,341,257	1.77	23.91
1880.						
January [b]			315	19,369	0.30	0.35
February [b]			526	30,256	.50	.53
March [b]			630	38,737	.60	.69
April [b]			5,781	343,993	5.50	6.14
May	10,980	4,370	7,251	445,846	6.90	7.96
June	10,820	5,240	7,742	460,681	7.37	8.22
July	4,630	1,680	3,255	200,142	3.10	3.57
August			735	45,193	.70	.81
September			74	4,403	.07	.08
October			32	1,967	.03	.03
November [b]			21	1,249	.02	.02
December [b]			630	38,737	.60	.69
The year			2,249	1,630,573	2.14	29.09

[a] Authority: California State engineering department from November, 1878, to October, 1884; United States Geological Survey from June, 1895, to December, 1900.

[b] Estimated from run-off of neighboring streams and from previous measurements.

Estimated monthly discharge of Stanislaus River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January [a]			2,102	129,247	2.00	2.31
February [a]			5,255	291,847	5.00	5.21
March [a]			2,102	129,247	2.00	2.31
April [a]			4,729	281,394	4.50	5.02
May [a]			5,255	323,117	5.00	5.76
June [a]			2,733	162,625	2.60	2.90
July			960	59,028	.91	1.05
August			360	22,136	.34	.39
September			140	8,330	.13	.15
October			120	7,378	.11	.13
November			150	8,925	.14	.16
December			1,488	91,493	1.42	1.64
The year			2,116	1,514,767	2.01	27.03
1882.						
January			398	24,472	0.38	0.44
February			908	50,428	.86	.89
March			4,771	293,357	4.54	5.23
April			3,782	225,044	3.60	4.02
May			5,155	316,968	4.91	5.66
June [a]			5,255	312,694	5.00	5.58
July [a]			1,892	116,334	1.80	2.08
August [a]			105	6,456	.10	.12
September [a]			105	6,248	.10	.11
October [a]			473	29,083	.45	.52
November [a]			368	21,897	.35	.39
December [a]			210	12,912	.20	.23
The year			1,951	1,415,893	1.85	25.27

[a] Estimated from run-off of neighboring streams and from previous measurements.

Estimated monthly discharge of Stanislaus River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1883.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			525	32,281	0.50	0.58
February [a]			420	23,325	.40	.42
March [a]			840	51,649	.80	.92
April [a]			2,102	125,078	2.00	2.23
May [a]			5,255	323,117	5.00	5.76
June [a]			4,204	250,155	4.00	4.46
July [a]			1,051	64,623	1.00	1.15
August [a]			315	19,368	.30	.35
September [a]			210	12,496	.20	.22
October [a]			168	10,330	.16	.18
November [a]			210	12,496	.20	.22
December [a]			210	12,912	.20	.23
The year			1,292	937,830	1.23	16.72
1884. [a]						
January			263	16,171	0.25	0.29
February			3,153	181,362	3.00	3.24
March			4,204	258,494	4.00	4.61
April			4,729	281,394	4.50	5.02
May			4,729	290,775	4.50	5.19
June			5,255	312,694	5.00	5.58
July			4,204	258,494	4.00	4.61
August			1,051	64,623	1.00	1.15
September			210	12,496	.20	.22
October			158	9,715	.15	.17
1895.						
June	8,510	3,842	5,686	338,340	5.41	6.04
July	3,842	550	1,778	109,330	1.69	1.95
August	550	145	330	20,304	.31	.36
September	3,161	145	638	37,970	.61	.68
October	246	145	176	10,802	.17	.19
November	179	179	179	10,651	.17	.19
December	414	145	198	12,208	.19	.22

[a] Estimated from run-off of neighboring streams and from previous measurements.

Estimated monthly discharge of Stanislaus River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1896.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	6,956	150	1,806	111,058	1.72	1.98
February	1,208	632	782	45,038	.75	.80
March	12,000	694	2,464	151,505	2.35	2.70
April	9,050	1,966	3,274	194,870	3.11	3.48
May	13,050	2,290	4,717	290,092	4.57	5.17
June	11,000	2,656	6,541	389,247	6.22	6.97
July	3,156	470	1,293	79,503	1.23	1.42
August	2,412	218	385	23,703	.37	.42
September	962	252	332	19,761	.32	.35
October	370	218	239	14,695	.22	.26
November	4,514	252	705	41,968	.67	.75
December	1,750	470	681	41,904	.65	.75
The year	13,050	150	1,935	1,403,344	1.85	25.05
1897.						
January	2,251	410	609	37,446	0.58	0.67
February	10,580	1,264	3,252	180,607	3.10	3.23
March	5,062	1,264	1,915	117,750	1.82	2.10
April	9,234	1,880	5,064	301,328	4.81	5.37
May	9,980	5,480	7,324	450,338	6.97	8.04
June	3,974	860	2,077	123,590	1.98	2.21
July	1,180	250	582	35,786	.55	.63
August	230	170	198	12,175	.19	.22
September	190	140	152	9,045	.14	.16
October	250	140	176	10,822	.17	.20
November	780	170	255	15,174	.24	.27
December	1,516	210	411	25,272	.39	.45
The year	10,580	140	1,835	1,319,333	1.74	23.55

Estimated monthly discharge of Stanislaus River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1898.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	336	74	207	12,728	0.20	0.23
February	1,372	156	389	21,604	.37	.39
March	1,000	336	572	35,171	.54	.62
April	3,920	536	1,813	107,881	1.73	1.93
May	2,540	536	1,378	84,730	1.31	1.51
June	880	480	647	38,499	.62	.69
July	384	74	167	10,268	.16	.18
August	100	27	66	4,058	.06	.07
September	100	50	61	3,630	.06	.07
October	100	74	77	4,735	.07	.08
November	100	50	71	4,225	.07	.08
December	315	74	139	8,547	.13	.15
The year	3,920	27	466	336,076	.44	6.00
1899.						
January	1,240	70	457	28,100	0.44	0.51
February	690	130	355	19,716	.34	.35
March	13,940	220	2,425	149,108	2.31	2.66
April	5,270	1,450	3,525	209,752	3.35	3.74
May	5,780	1,450	2,559	157,348	2.43	2.80
June	4,632	1,045	2,663	158,459	2.53	2.82
July	1,120	175	502	30,867	.48	.55
August	265	90	150	9,223	.14	.16
September	130	50	85	5,058	.08	.09
October	1,200	90	309	19,000	.29	.33
November	2,340	90	1,092	64,978	1.04	1.16
December	5,015	550	1,461	89,834	1.39	1.60
The year	13,940	50	1,299	941,443	1.24	16.77

Estimated monthly discharge of Stanislaus River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1900.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	7,050	820	1,944	119,532	1.85	2.13
February	1,100	540	700	38,876	.67	.70
March	2,640	540	1,829	112,461	1.74	2.01
April	3,000	1,260	1,761	104,787	1.68	1.87
May	4,377	1,260	3,343	205,553	3.18	3.67
June	3,125	960	1,863	110,856	1.77	1.97
July	960	70	349	21,459	.33	.38
August	110	30	64	3,935	.06	.07
September	70	30	46	2,737	.04	.04
October	2,760	70	448	27,546	.43	.49
November	6,037	310	1,220	72,595	1.16	1.29
December	1,640	610	871	53,556	.83	.95
The year	7,050	30	1,203	873,893	1.15	15.57

Discharge measurement of Cascade Creek, Stanislaus River, Tuolumne County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Oct. 21, 1896	J. B. Lippincott	0.0

Discharge measurement of Cow Creek, Stanislaus River, Tuolumne County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Oct. 21, 1896	J. B. Lippincott	0.5

Discharge measurement of Stanislaus River, Main Fork, Eureka Valley, Tuolumne County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Nov. 20, 1896	J. B. Lippincott	158.0

Discharge measurement of Mill Creek, Stanislaus River, Tuolumne County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Oct. 21, 1896	J. B. Lippincott	1.5	

Discharge measurement of Niagara Creek, Stanislaus River, Tuolumne County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Oct. 21, 1896	J. B. Lippincott	1.5	

Discharge measurement of Stanislaus River, Middle Fork, Donnels Flat, near mouth of Niagara Creek, Tuolumne County.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-feet.	
Oct. 12, 1899	Mr. Coul	144	Mean of 12 measurements not influenced by reservoired water; no diversion above.

Discharge measurement of Stanislaus River, Middle Fork, north of Shot Gun, Tuolumne County.

Date.	Hydrographer.	Discharge.	Remarks.
1901.		*Sec. feet.*	
Sept. 16, 17	C. E. Moore	300	

Discharge measurement of Stanislaus River, Oakdale Ditch Company's Flume, Stanislaus County.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1899.		*Feet.*	*Sec.-feet.*	
May 19	S. G. Bennett		10.6	
1902.				
May 12	S. G. Bennett	23	36.0	Flume No. 13, main canal below head of Oakdale Canal.
Do	do		73.0	Flume No. 6, main canal below head of Oakdale Canal.
Do	do		13.71	

Discharge measurements of Stanislaus Water Company's Canal, Stanislaus River, near Knights Ferry, Stanislaus County.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1896.		*Feet.*	*Sec.-feet.*	
Sept. 8	H. Crowe		66	
Oct. 30	J. B. Lippincott		38	
1897.				
Feb. 16	J. B. Lippincott		26	Below forks.
Do	do		13	Little John Canal.
	Total		39	
May 30	J. B. Lippincott		54	Main canal below forks.
Do	do		12	Little John Canal.
	Total		66	
July 13	A. Q. Campbell		36	Below forks.
Do	do		15	Little John Canal.
	Total		51	
Sept. 6	A. Q. Campbell		52	Below forks.
Do	do		1	Little John Canal.
	Total		53	
Oct. 29	A. Q. Campbell		35	Below forks.
Do	do		1	Little John Canal.
	Total		36	
Dec. 19	J. B. Lippincott		17	Below forks.
Do	do		4	Little John Canal.
	Total		21	

Discharge measurements of Stanislaus Water Company's Canal, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1898.		*Feet.*	*Sec.-feet.*	
Apr. 17	J. B. Lippincott		58	
June 1	do		72	Main canal flume No. 3.
July 29	do		42	Do.
Oct. 5	do		33	
Oct. 6	do		33	
1899.				
May 19	S. G. Bennett		74	Do.
June 6	do		71	Do.
1900.				
May 9	S. G. Bennett	2.79	95	Do.
Sept. 7	do		85	At headworks of canal.
1902.				
May 12	S. G. Bennett	1.14	129	Flume No. 3, main canal.
Aug. 16	E. T. Perkins		3.5	San Antonio Creek below mouth of Big Tree Creek.
Aug. 17	do		67	Angel's ditch near head North Fork Stanislaus.
Do	do		1	North Fork, 400 feet below suspension bridge.
	Total		68	
Aug. 17	E. T. Perkins		2.3	Mill Creek at junction Love and Morgan creeks.
Aug. 20	do		54	Power company's flume above ditch tender's house, South Fork.
Do	do		16	Do.
Aug. 21	do		53	Clarks Fork at mouth Middle Fork.
Do	do		126	Middle Fork below mouth of Clarks Fork.
Do	do		73	Middle Fork above mouth of Clarks Fork.
Aug. 14	do		53	Standard ditch at flume No. 59.
Aug. 22	L. M. Lawson		193	Below Colliers.
Aug. 24	do		170	Abbotts ferry.
Aug. 21	do	.6	168	Parrotts ferry.
Aug. 23	do		171	Robinsons ferry.
Aug. 19	do		166	Knights ferry.
Aug. 17	do		154	Stanislaus Water Co.'s canal below intake.

Discharge measurements of Stanislaus Water Company's Canal, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.	Remarks.
1900.		*Feet.*	*Sec.-feet.*	
Sept. 7	S. G. Bennett		[a] 28	At headworks Stanislaus Water Co.'s Canal, 6 miles above Knights Ferry.
Sept. 7	do		[b] 85	
	Total		113	

[a] River. [b] Canal.

Discharge measurements of Stanislaus River, Tuolumne County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
1896.		*Feet.*	*Sec.-feet.*	
Sept. 3	J. B. Lippincott		60	South Fork at Sugar Pine. In flume; not entire flow of river.
1901.				
Sept. 17	C. E. Moore		300	Middle Fork, 15 miles above junction with North Fork.

STONY CREEK.

This stream drains 700 square miles of the eastern slopes of the Coast Range. After reaching the Sacramento Valley it flows north for a number of miles, contrary to the general drainage, and then turns eastward and enters the Sacramento River 20 miles below Vina, Cal. A large portion of the basin near the heads of the stream is heavily covered with commercial timber. There are a number of good reservoir sites on this stream and its tributaries.

On January 30, 1901, a gaging station was established by Mr. Burt Cole at Julian's ranch, 6 miles northwest of the town of Fruto, Cal., to determine the amount of water available for storage.

For a description in detail of the reservoir sites and drainage basin of Stony Creek, see Water-Supply and Irrigation Paper No. 86.

Discharge measurements of Stony Creek, Glenn County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
		Feet.	*Sec.-feet.*	
Aug., 1900[a]	Burt Cole		0.0	Grindstone Creek, 4 miles above mouth.
Sept., 1900[a]				
Oct., 1900[a]				
Nov. 22, 1901	H. E. Green		38.0	Grindstone Creek, point above bridge.
Aug. 3, 1900	Burt Cole		1.7	Hall ditch.
Sept. 30, 1900	do		1.4	Hall ditch, 100 feet above head gate.
July 28, 1900	do		2.3	Orland ditch.
Aug. 3, 1900	do		1.7	Do.
Sept. 30, 1900	do		1.3	Do.
Sept. 22, 1900	S. G. Bennett		7.7	1 mile below Elk Creek.
Aug., 1900[a]	Burt Cole		.0	Briscoe Creek, at mouth.
Sept., 1900[a]				
Oct., 1900[a]				
Nov. 22, 1901	H. E. Green		10.4	Briscoe Creek, above dam site.
Sept. 21, 1900	Burt Cole		13.8	Brown ditch.
Sept. 1, 1899	W. W. Brier		3.25	Thomas Creek, Tehama County, at Richfield Station.
Nov. 11, 1900	Burt Cole		62.0	Gaging station, Julian's ranch.
Feb. 19, 1901	do		18,000.0[b]	
Feb. 27, 1901	do	6.9	2,583.0	Do.
Mar. 9, 1901	do	5.6	933.0	Do.
Apr. 30, 1901	S. G. Bennett	4.9	382.0	Do.
Sept. 3, 1901	do	3.17	3.4	Do.
Nov. 21, 1901	H. E. Green	4.3	165.0	Do.
Jan. 26, 1902	S. G. Bennett	3.9	126.0	Do.
Feb. 28, 1902	do	10.0	7,336.0	Do.
May 8, 1902	S. G. Bennett	5.33	1,080.0	Do.
Sept. 24, 1902	do	3.00	14.0	Do.
Sept. 21, 1900	B. Cole		.3	Laux ditch.
Do	do		20.0	Stony Creek, near Stony Fork, above Laux ditch.
Sept. 26, 1900	do		6.2	Stony Ford ditch, at headgate.
Sept. 21, 1900	do		.3	Welton ditch headgate.

[a] Dry.

[b] Estimated.

Estimated monthly discharge of Stony Creek at Julian's ranch.

[Drainage area, 760 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
February	10,385	725	2,707	150,339	3.56	3.71
March	2,215	435	893	54,908	1.18	1.36
April	630	225	361	21,481	.48	.54
May	555	225	349	21,459	.46	.53
June	195	5	66	3,927	.09	.10
July	15	0	7	430	.01	.01
August	10	2	4	246	.01	.01
September	725	5	35	2,083	.05	.06
October	340	0	130	7,993	.17	.20
November	1,125	35	161	9,580	.21	.23
December	3,875	77	425	26,132	.56	.64
11 months	10,385	0	428	298,578	.57	7.39
1902.						
January	150	109	114	7,010	0.15	0.17
February	14,650	109	4,201	233,312	5.53	5.76
March	7,000	920	2,588	159,130	3.41	3.93
April	4,680	690	1,522	90,565	2.00	2.23
May	1,000	270	578	35,540	.76	.88
June	370	5	132	7,855	.17	.19
July	9	2	3	184	0	0
August	5	2	3	184	0	0
September	14	5	9	536	.01	.01
October	225	55	92	5,657	.12	.14
November	5,005	109	1,584	94,255	2.08	2.32
December	2,765	690	1,132	69,604	1.49	1.72
The year	14,650	2	997	703,832	1.31	17.35

SUSAN RIVER.

Discharge measurements of Susan River at Honey Lake Basin, Lassen County.

Date.	Hydrographer.	Gage height.	Discharge.	Locality.
1899.		*Feet.*	*Sec.-feet.*	
Apr. 18	Albert Halen		25.0	Mouth of Willow Creek.
Apr. 18	W. D. Minckler		25.0	Do.
Apr. 23	Albert Halen		28.0	Do.
June 4	do		25.0	Do.
Apr. 24	W. D. Minckler		28.0	Willow Creek, near Ravencrofts.
June 4	do		24.0	Do.
June 11	Albert Halen		21.0	Do.
June 11	W. D. Minckler		21.0	Do.
1900.				
June 4	L. H. Taylor	2.60	16.0	Do.
July 30	do	2.85	26.0	Do.
Oct. 10	do	2.80	20.0	Do.
1899.				
Apr. 18	Albert Halen		139.0	Main river, dam near mouth of Willow Creek.
Apr. 23	do		115.0	Do.
June 4	do		37.0	Do.
June 11	do		33.0	Do.
June 11	do		34.0	Main river, below dam.
Apr. 18	W. D. Minckler		14.5	Do.
Apr. 23	do		41.0	Do.
June 11	do		34.0	Main river, below Colony dam.
	do		23.0	Do.
1900.				
June 30	L. H. Taylor	3.20	40.0	Near Susanville.
July 5	do	2.60	8.0	Do.
1901.				
Mar. 16	do	4.30	274.0	Do.
Apr. 5	do	4.00	178.0	Do.
May 20	do	4.50	351.0	Do.
June 7	do	3.60	84.0	Do.

Discharge measurements of Susan River at Honey Lake Basin, etc.—Continued.

Date.	Hydrographer.	Discharge.	Locality.
1899.		*Sec.-feet.*	
June 11	W. D. Minckler	33.00	North and South branches above Colony dam.
Apr. 24	do	31.00	South Branch, Otis Johnson's.
June 4	do	30.00	Do.
Apr. 4	do	11.00	North Branch, Otis Johnson's.
June 4	do	7.00	Do.
Apr. 18	do	30.00	Tanners Slough.
Apr. 23	do	27.00	Do.
June 4	do	15.00	Do.
June 11	do	18.00	Do.

SUTTER RIVER.

Discharge measurement of Sutter River, Amador County.

Date.	Hydrographer.	Discharge.	Locality.
1899.		*Sec.-feet.*	
Sept. 18	S. G. Bennett	1.00	At Sutter Creek (estimated).

SWEETWATER RIVER.

The drainage basin of Sweetwater River is in the extreme southwestern corner of the United States, being in San Diego County, Cal., adjacent to the Republic of Mexico. The river flows from the western slope of Cuyamaca Mountain, which rises to an elevation of 6,000 feet. The city of San Diego, on the coast, is about 33 miles west and 12 miles south of this peak. The drainage basin is 34 miles in length by about 5 miles in width, its total area above the reservoir being 186 square miles, as determined in part from survey and in part from the county maps. This area is classified as follows:

	Sq. miles.
Steep and rocky mountains favorable to large run-off	26
Lower rolling mountains, usually covered with brush	99
Rolling hills, covered with soil and disintegrated granite	30
Agricultural lands (17 per cent) and river bottom	31
Total	186

The most noticeable topographic feature of this basin influencing the run-off is the abrupt flattening of the slopes at the base of the mountains into agricultural fields. The drainage lines deeply cut into the steep hillsides are quickly lost or are poorly defined in crossing the flat

alluvial cones or partly filled valleys on the low grounds. In turn, the nearly level fields or parks drain into deep canyons. The occasional flood caused by a heavy rain rushing down the mountain side spreads out over the flat lands, much of it disappearing before it can reach the lower canyon. The steady percolation which might be expected at points below is to a large extent cut off by the high rate of evaporation, and thus the percentage of run-off, taking the basin as a whole, is small. A more detailed description of this river is given in William Ham. Hall's report on irrigation in southern California.

The figures relating to the amount of water draining from this basin and also the other details given in the following table have been compiled from data obtained by Mr. H. N. Savage, chief engineer, and Mr. James D. Schuyler, consulting engineer, of the San Diego Land and Town Company. The first column in the table gives the evaporation from the surface of the Sweetwater reservoir in inches in depth per month. This was measured from a metallic pan exposed to the direct rays of the sun at a point near the dam, this being continued in use until May, 1893. Subsequently observations were made by means of a Piche evaporometer.[a] This was placed in an instrument shelter of the ordinary type used by the Weather Bureau. This shelter is 15 feet above the ground and about 40 feet above the level of the lake, being located 500 feet northeast from the gate tower. It has been noted that the records from the Piche evaporometer which cover the same months as those from the pan are in the ratio of 48 to 57. It is believed that the exposed pan gives more nearly the evaporation from the water surface than the Piche evaporometer. If the evaporation were annually 5 feet in depth from the surface of the reservoir—that is, from the 70-foot level down to the 65-foot level—the loss would amount to 24 per cent of the total amount stored. The area of the reservoir at the 70-foot level is 721.86 acres.

The average wind velocity given in miles per hour is that noted at the city of San Diego, 12 miles from the reservoir, and under similar conditions. In this connection it may be well to note the results obtained by Prof. Thomas Russell as to the effect of velocity upon evaporation obtained by whirling the Piche evaporometer at varying rates.

Experiments were made which show that the effect of the wind on the evaporation from a vessel exposed in the open air is very great. Two Piche instruments were taken, one suspended in quiet air and the other fixed rigidly on the end of the 28-foot arm of the whirling machine set up in the inclosure of the Pension Office building. The whirling machine was the one used in standardizing anemometer.

The instruments, filled with water, were first weighed on a fine balance to the hundredth of a gram. The whirling arm was then turned so that the Piche on its end moved with a velocity of 5 miles an hour. The motion was continued for

[a] Described by Prof. Thomas Russell in the Monthly Weather Review for September, 1888, in connection with a report upon the depth of evaporation in the United States.

half an hour, and at the end of the time both Piches were again weighed. Then the Piche that had been suspended in quiet air was put on the arm, and the one that had been on the arm was put in its place. The whirling was then started again at the same velocity, and continued for another half hour. At the end of the time the Piches were again weighed. While this was being done the humidity of the air was determined from time to time by means of whirled wet and dry bulb thermometers.

Observations were also made in the same way with the Piche moving at velocities of 10, 15, 20, 25, and 30 miles per hour. At a velocity of 5 miles an hour the evaporation from a Piche was 2.2 times that from one in quiet air; at 10 miles, 3.8 times; at 15 miles, 4.9 times; at 20 miles, 5.7 times; at 25 miles, 6.1 times; and at 30 miles, 6.3 times. During the time the observations were made, June 25 and 26, 1888, the average temperature of the air was 83.7 and the relative humidity 50 per cent.

Measurements were made of the relative humidity at the reservoir during 1893 and 1894. When not obtained at this point they are given from the Weather Bureau figures for San Diego. The temperature of the air is taken as the average of the maximum and minimum daily readings. The temperature of the water in the lake and also in the pan was taken daily. That in the pan was observed at about 2 p. m., thus giving a reading slightly higher than that of the lake, as the pan under the hot sun caused the water to warm slightly. If two readings had been taken each day at intervals of twelve hours the average would probably have been very nearly that of the lake. It is noted that the water in the lake was usually a few degrees warmer than the atmosphere.

RAINFALL IN SWEETWATER BASIN.

The rainfall has been measured at two rain gages, one at the reservoir and one at Descanso, 25 miles east of the reservoir and at an elevation of 3,500 feet. The Descanso gage is 3 miles to the east of the summit of a ridge which may act in such a manner as to cut off the precipitation, thus reducing it below a theoretical amount for this position. In addition to the two rain gages within the drainage basin, the record from a third—that at the Cuayamaca reservoir—is given. This is at an elevation of 4,800 feet, and is only 3 miles distant from the divide between the drainage of Sweetwater and of San Diego River. The gage here is in a narrow valley or canyon, and the results obtained, being probably influenced by local topography, are regarded as excessive for this altitude and the locality. The rainfall at the dam in the winter of 1900–1901 was 11 inches.

The total amount of precipitation, as obtained at the reservoir and at Descanso, is not considered as showing the rainfall upon the drainage basin as a whole. One of the gages is located too high and the other too low to fairly represent the average conditions. In order, therefore, to obtain approximately the total amount of water falling upon the basin, certain assumptions are made and corrections are

applied to the recorded precipitation. It is assumed that there is a regular increase in the rate of precipitation with altitude, and that this is at the rate of 0.6 inch of rain for each 100 feet increase in elevation. It is also assumed that the mean elevation of the whole basin is approximately 2,200 feet. Taking San Diego, which is nearly at sea level, as the base station, this, under the assumptions just given, would indicate that the rainfall on the basin should average 13.2 inches greater than that at San Diego. As the average rainfall at San Diego is 9.92 inches, the rainfall on the Sweetwater catchment area should be 9.92 plus 13.2 inches, or 23.12 inches.

In the same way the average rainfall is deduced from the measurements at the points within the basin. At Descanso the average rainfall is 26.38 inches. This point, having an altitude of 3,500 feet, is 1,300 feet above the assumed altitude of Sweetwater basin. Deducting, therefore, 7.8 inches leaves 18.58 inches as the average rainfall. Again, taking the results obtained at the rain gage at the Sweetwater reservoir, 12.01 inches, at an elevation of 250 feet, and adding to this the theoretical increase due to altitude of 11.70 inches, the sum 23.71 can be applied to the basin. The average of these two computations, based on the observations at Descanso and at the reservoir, is 21.14 inches for the basin. This method has been used in the following table, page 351, in determining the average rainfall throughout the 186 square miles in the catchment basin for each year, additions being made to the rainfall recorded at the reservoir, and subtractions from that at Descanso, the average of the two results thus obtained being given in the table.

RUN-OFF FROM SWEETWATER BASIN.

The discharge from this watershed, embracing 186 square miles, during the winter of 1900–1901, was 280,000,000 gallons, or 861 acre-feet.

The run-off shown in the table on page 351 has been computed by Mr. H. N. Savage. The stream usually ceased flowing about the 1st of June and remained dry throughout the summer, water flowing again in the fall or early winter after the rains began. At this latter time the reservoir is at a low stage, the water having been used for irrigation during the hot season. The flow into the reservoir, being wholly held, is therefore computed from the increase of height shown by the readings on the gage rod in the reservoir, due allowance being made for evaporation and the amount withdrawn. Later, when the reservoir is full and some of the water overflows, an additional amount must be added. To obtain this amount is a somewhat difficult matter, as the water flows out through a gate valve, over the waste weir, and also occasionally, during floods, over the top of the dam.

Evaporation, temperature, and rainfall at Sweetwater reservoir, San Diego County.

Month.	Evaporation.	Wind (miles per hour).	Humidity.	Temperature.		Rainfall.		
				Air, degrees Fahrenheit.	Water, degrees Fahrenheit.	At reservoir.	At Descanso.	At Cuyamaca.
1888.	*Inches.*		*Per cent.*			*Inches.*	*Inches.*	*Inches.*
September				70		0.00		0.21
October				65		.36		3.82
November				60		2.81		8.33
December				58		3.20		13.30
1889.								
January	1.990	4.8	80	57		1.56		2.99
February	3.336	5.7	74	56		.82		4.70
March	3.380	5.4	80	59		3.87		12.85
April	4.961	5.6	79	61		.36		3.34
May	5.822	5.9	75	61		.21		2.21
June	6.806	5.5	81	64		.33		.00
July	7.398	5.1	79	67		.01		.00
August	8.253	5.0	69	73		.00		1.71
September	7.360	5.1		71		.00		.03
October	2.998	4.7		65		2.22		2.82
November	4.800	4.4		60		1.08		1.64
December	.246	4.7		56		7.07		21.00
1890.								
January	1.588	5.0		48		2.20		11.02
February	2.214	5.2		52		2.07		16.36
March	3.280	4.9		55		1.30		4.00
April	4.141	5.1		58		.10		.97
May	6.140	4.6		60		.41		.00
June	7.302	5.4		65		.00		.00
July	7.380	4.7		70		.00		.09
August	9.020	4.6		71		.07		.90
September	6.482	4.3	69	72		.42		1.40
October	4.920	4.0	79	66		.45		.58
November	5.535	4.3	59	65		.93		3.62
December	1.845	4.5	83	62		2.29		12.13
1891.								
January	3.608	4.4	58	55		.83		.00
February	1.353	5.8	73	52		5.28		34.70
March	3.075	5.3	74	57		.23		3.17
April	3.707	4.9	76	58	70	1.27		3.50

Evaporation, temperature, and rainfall at Sweetwater reservoir, etc.—Continued.

Month.	Evaporation.	Wind (miles per hour).	Humidity.	Temperature.		Rainfall.		
				Air, degrees Fahrenheit.	Water, degrees Fahrenheit.	At reservoir.	At Descanso.	At Cuyamaca.
1891.	*Inches.*		*Per cent.*			*Inches.*	*Inches.*	*Inches.*
May	5.599	5.4	75	61	69	0.83		3.69
June	6.027	4.6	74	65	78	.09		.00
July	6.501	4.0	78	71	80	.00		.04
August	8.890	3.8	77	73	82	.03		.30
September	6.150	4.7	76	73	76	.00		2.67
October	6.314	3.8	79	66	72	.00		.00
November	4.100	3.8	74	60	64	.13		.45
December	2.752	5.4	65	52	54	.90		6.75
1892.								
January	2.542	3.7	58	55	54	2.42		7.23
February	1.394	4.7	75	54	63	3.47		6.47
March	3.075	4.8	73	56	66	.55		7.76
April	5.822	5.5	82	57	70	.93		3.35
May	4.674	5.7	68	61	71	1.39		5.90
June	6.478	5.6	69	63	74	.07		.67
July	8.808	5.0	73	67	78	.00		.00
August	6.540	4.9	74	68	78	.02		.00
September	6.273	4.8	74	68	76	.00	0.00	.00
October	6.560	4.2	65	64	[a]68	.15	.00	.30
November	4.766	3.7	50	62	60	.04	1.50	2.87
December	2.614	4.3	66	53	56	2.12	2.00	3.76
1893.								
January	2.768	4.0	51	57	58	.22	3.01	5.55
February	2.214	5.1	67	54	59	1.96	2.64	9.13
March	1.076	6.2	76	51	60	6.50	14.07	15.60
April	5.002	5.3	73	58	64	.27	.50	1.00
May	4.902	5.8	72	61	68	.20	.00	1.00
June	3.411	4.9	77	65	76	.00	.00	.00
July	5.318	5.1	77	69	81	.16	.75	1.20
August	4.693	5.0	75	72	80	.00	.00	.30
September	4.864	5.1	75	66	77	.00	.25	.00
October	4.586	4.6	67	65	70	.33	1.25	1.90
November	4.513	4.5	65	58	60	.84	3.15	3.30
December	6.283	4.5	60	58	58	2.08	4.38	6.05

[a] End of measurements from pan and beginning of observations on Piche evaporometer.

Evaporation, temperature, and rainfall at Sweetwater reservoir, etc.—Continued.

Month.	Evaporation.	Wind (miles per hour).	Humidity.	Temperature.		Rainfall.		
				Air, degrees Fahrenheit.	Water, degrees Fahrenheit.	At reservoir.	At Descanso.	At Cuyamaca.
1894.	*Inches.*		*Per cent.*			*Inches.*	*Inches.*	*Inches.*
January	3.897	5.0	68	50	52	0.36	2.10	2.05
February	3.533	5.2	67	50	56	.71	3.40	2.05
March	3.008	5.8	73	56	59	1.69	3.63	3.00
April	3.634	5.4	70	59	65	.04	.13	.00
May	3.451	5.7	74	59	68	.15	.50	1.00
June	4.683	5.6	72	62	76	.00	.38	.50
July	3.161	5.2	75	67	80	.00	.12	.00
August	3.066	4.8	77	68	82	.00	.13	1.50
September	4.637	5.1	76	69	75	.00	.00	.40
October	3.232	3.8	72	64	70	.04	.00	.00
November	3.347	3.9	76	59	64	.00	.00	.00
December	2.344	4.3	73	54	59	3.03	7.62	12.76
1895.								
January	2.357	6.0	74	53	.....	9.63	19.52	28.43
February	2.850	5.0	.....	54	.....	1.52	2.76	6.05
March	3.121	5.3	.....	56	.....	1.18	3.13	5.52
April	3.939	5.2	.....	58	.....	.44	.64	1.20
May	4.119	5.8	77	63	.....	.35	.63	.16
June	3.188	.....	.....	66	.....	.00	.00	.00
July	[a]6.428	.....	.....	69	.....	.00	.00	.00
August	[a]6.744	.....	.....	71	.....	.00	.00	.00

[a] Estimated.

The following table gives, for the period from 1888 to 1901, the estimated precipitation upon the catchment basin, obtained as stated on page 347, also the depth of run-off in inches and the relation which this bears to the depth of rainfall, by years. The years chosen are not calendar years, but extend from September to August, inclusive, as this division is more in accordance with the distribution of rainfall and the discharge of the streams.

Estimated rainfall upon the Sweetwater catchment basin; also depth and percentage of run-off.

Year.	Rain.	Run-off.		Per cent.
		Per square mile.	Inches.	
	Inches.	*Sec.-feet.*		
1887–88		0.0524		
1888–89	21.00	.1875	2.54	12.000
1889–90	25.71	.1525	3.71	14.000
1890–91	23.40	.1602	2.07	9.000
1891–92	17.14	.0460	.62	4.000
1892–93	20.00	.1210	1.61	8.000
1893–94	14.76	.0099	.14	1.000
1894–95	27.14	.5452	7.12	26.000
1895–96	19.54	.0098	.101	.517
1896–97	24.91	.0512	.665	2.67
1897–98	18.18	.00003	.0005	.003
1898–99	18.51	.0018	.025	.135
1899–1900	19.10	0	0	0
1900–1901	23.65	.0063	.087	.368
1901–1902	20.29	0	0	0

The figures showing evaporation, wind movement, humidity, and temperature are brought together for comparison by years in the following table. In this case, as stated above, the years extend from September to August, inclusive, as this most nearly agrees with the natural division.

Annual evaporation, temperature, etc., in Sweetwater Basin.

[Elevation of reservoir, 250 feet.]

Period.	Evaporation.	Wind.	Humidity.	Temperature of air.	Temperature of water.
	Inches.	*Miles per hour.*	*Per cent.*	*Deg. F.*	*Deg. F.*
1888–89					
1889–90	56.47	4.9			
1890–91	57.54	4.6			
1891–92	58.65	4.8	72	61	68
1892–93	49.60	4.9	68	61	67
1893–94	48.68	5.1	70	60	67
1894–95	46.31	5.2	79	59	
1895–96	45.18	5.2	71	61	
1896–97	[a]41.24	5.3	76	61	
1897–98	61.93	5.9	73	60	
1898–99	[b]32.54	5.8	72	59	
1899–1900		5.7	75	61	
1900–1901				62	

[a] Evaporation January 1 to August 31. [b] Evaporation September 1 to April 30.

FLOODS IN THE RIVER.

The Sweetwater, like the other rivers of southern California, is liable at times to extraordinary floods, due to heavy precipitation upon the catchment basin. In 1893 two floods furnished 70 per cent of the annual discharge of the river for that year. For the 24 hours ending March 24, 1893, the river discharged 3,069 acre-feet. For the seven days ending March 27, the total amount discharged was 7,980 acre-feet. In January, 1895, a flood was carefully watched and the flow computed at short intervals, as shown in the following table. The total run-off from 5 p. m. on January 14 to noon on January 22 was equivalent to a trifle over 4.70 inches over the whole drainage basin, or in all 46,670 acre-feet. This same storm gave a maximum discharge from Cedar, Boulder, and Colman creeks, aggregating 100 square miles within the drainage basin of San Diego River, of 13,000 second-feet.

Rate of flow during flood of January, 1895, in Sweetwater River.

Time.	Second-feet.	Time.	Second-feet.
January 14:		January 17—Continued.	
5 p. m	0	3 p. m	4,416
January 15:		January 18:	
7 a. m	84	8 a. m	3,331
12 m	1,855	9 a. m	2,090
3 p. m	6,410	10 a. m	2,048
4 p. m	5,214	7 p. m	2,466
5 p. m	5,262	January 19:	
6 p. m	4,152	5 a. m	1,532
7 p. m	6,135	8.30 a. m	2,944
9 p. m	5,567	9.30 a. m	2,888
10 p. m	5,080	10.30 a. m	3,068
January 16:		11.30 a. m	3,470
5 a. m	3,297	1.30 p. m	3,364
6 a. m	4,720	3 p. m	3,968
7 a. m	3,585	3.30 p. m	4,692
8.30 a. m	5,316	4 p. m	3,224
9.30 a. m	5,370	4.30 p. m	3,230
10.30 a. m	6,602	9 p. m	3,176
11.30 a. m	8,713	January 20:	
12.30 p. m	8,713	7 a. m	3,314
1.30 p. m	13,684	9 a. m	2,805
2 p. m	13,000	10 a. m	2,674
2.30 p. m	15,148	11 a. m	2,484
3.30 p. m	18,148	1 p. m	2,500
4 p. m	14,034	2 p. m	2,136
4.30 p. m	14,490	January 21:	
5.30 p. m	7,227	7 a. m	1,880
6.30 p. m	9,420	10 a. m	820
7.30 p. m	8,310	12 m	750
8 p. m	6,930	5.30 p. m	800
January 17:		January 22:	
5 a. m	5,302	7 a. m	810
6 a. m	3,545	12 m	530
8 a. m	3,954		

INCREASE OF PRECIPITATION WITH ALTITUDE.

In connection with the above data concerning the rainfall and run-off on the Sweetwater drainage basin, the writer has given a discussion of the precipitation in southern California, and has brought

together figures showing the increase of rainfall with altitude. The following statement is quoted from a report made on this subject:

The warm, moisture-laden winds from the sea on their inland journey are driven up the slopes in the Coast Range. As they rise in elevation they expand under the lighter atmospheric pressure, become chilled, and are deprived of all moisture in excess of the point of saturation at that temperature and pressure. This lowering of temperature in their ascent is more pronounced in winter than in summer, and, coupled with the fact that a high barometer is normal off the coast of southern California during the summer season, the winds yield much less rain.

The year in California is naturally divided into a wet and a dry season, the dry season beginning about the 1st of May, with little rain falling, except in thunderstorms in the high mountains, before the 1st of October. The rains then gradually increase, reaching their maximum in January. The records of the United States Signal Service and the Weather Bureau begin the year with the 1st of January. This is not a proper division in this region, as it will not show either the maximum or minimum years of rainfall. Engineers divide the year either with the 1st of July or the 1st of September.

The effect of topography on rainfall is given in a report by Prof. G. E. Curtis[a] in the following words:

"In general the amount of rain increases with the elevation above sea level up to a maximum plane, after which a decrease takes place. S. A. Hill has shown that in the northwest Himalayas, where the rainfall is most remarkable in amount and rate of variation, the observations can be represented by the following empirical formula: $R=1+1.92h-0.40h^2+0.02h^3$, in which R represents the amount of rain and h the relative height in units of 1,000 feet above the assumed plane, which is itself 1,000 feet above sea level. From this formula the height of maximum rainfall is computed to be 3,160 feet above the plane, or 4,160 feet above sea level. It is further shown that this elevation is that at which, according to the observed law of decrease of temperature, the southwest monsoon is cooled just below its dew-point. This point will be that at which in the mean we should expect the maximum precipitation to take place. * * * A very rapid diminution takes place on the leeward side, where the stations record only about half the amount of rainfall given by stations of equal elevation on the windward side."

Similar conditions prevail in California. In illustration the following table (p. 355) is given, in which the results obtained at a base station are compared with those from other stations in the vicinity and on that parallel. The base station in each case is one whose record is of long standing. In the table the second column gives the period during which the record has been kept. The third shows the elevation of the station above sea. The fourth gives the annual average recorded rain at that station. The fifth gives the relation of the rainfall at the base station, during the years that rainfalls were actually recorded at the station under consideration, to the total average rainfall recorded at the base station during its entire period of observation. The record at the second station is then adjusted by this ratio and a probable average rainfall is determined for the station considered and entered in the sixth column under the head "Probable mean rain."[b] For example, take the station Poway. The record at this point is for ten years, while the record at the base station, San Diego, has been kept for a period of

[a] Signal Service Notes, No. 16. The effect of wind currents on rainfall, by G. E. Curtis, Washington, 1884, pamphlet, 11 pp., pp. 6–7.

[b] See statement of Arthur Jacobs, late executive engineer for irrigation, Her Majesty's Bombay Service, in Van Nostrand's Science Series, No. 6, p. 11.

forty-five years. Now, the average annual rain for a period of forty-five years is probably nearer the actual average than that given by a record extending over a much less period. The two stations, being so near together and subject to the same general climatic conditions, have probably a close relation. If during the time that the record has been kept at Poway the rain at San Diego is found to be 117 per cent of the average of forty-five years, then the recorded rain at Poway is assumed to be 117 per cent of the average there.

By examining the data available, it has been found that the increase in precipitation due to elevation is approximately at the rate of 0.6 of an inch of rain for each 100 feet rise in elevation on the western slope of the Coast Range and of the Sierra Nevadas in California. There is also an increase due to elevation on the eastern slope, but this is very much less in amount. The figures in the seventh column in the table below have been obtained by adding the computed increase due to elevation above the base station to the recorded rain at the base station. By comparing these figures in the seventh column, showing theoretical rainfall, with the recorded mean rainfall and the probable mean rainfall given in the fourth and sixth columns, the applicability of this deduced rate of increase of precipitation with altitude is shown.

Table showing the relation of rainfall to elevation in California.

Station.	Period.	Elevation.	Rainfall.			
			Recorded.	Per cent.	Probable mean.	Theoretical.
First group.		*Feet.*	*Inches.*		*Inches.*	*Inches.*
San Diego [a]	1850–95	0	9.92			
Sweetwater, reservoir	1888–95	250	12.37	103	12.01	11.42
Poway	1878–89	460	13.38	117	11.43	12.68
Descanso	1889–95	3,500	26.65	101	26.38	30.92
Julian	1879–84	4,500	37.75	130	29.04	36.92
Cuyamaca	1887–95	4,800	44.66	102	43.79	38.72
Second group.						
Los Angeles [a]	1871–94	330	16.96			
Bear Valley, reservoir	1883–94	6,000	54.03	110	49.09	50.92
Third group.						
Sacramento [a]	1849–89	31	19.90			
Auburn	1870–84	1,360	32.72	102	32.08	27.78
Colfax	1870–84	2,422	44.81	102	43.93	34.20
Cisco	1870–84	5,934	57.41	102	56.28	55.20
Summit	1870–84	7,017	47.93	102	46.99	61.80
Fourth group.						
Truckee	1870–84	5,919	29.53	102	28.95	54.60
Reno	1870–91	4,497	5.17	102	5.07	46.56
Wadsworth	1870–91	4,085	3.83	102	3.75	44.28

[a] Base stations.

The stations of the first and second groups are located in San Diego County, and are all on the western slope of the Coast Range. Bear Valley is 80 miles east of Los Angeles on the same slope. The third group comprises the stations along the Central Pacific from Sacramento east to the summit, and the fourth those along the same line of road on the eastern slope 14, 49, and 83 miles by rail beyond the summit. This fourth group is given to show that wholly different conditions prevail on the eastern and on the western slope of the mountain.

All these records are seasonal, the year being divided at the 1st of September when possible. Data are given from Signal Service and Weather Bureau reports, and from those of the California State engineer, the former being accepted in cases of difference. Excepting the fourth or last group, which is given simply to show that the conditions prevailing on the eastern slope are different from those of the western, it may be seen that the theoretical rain is very nearly the same as the probable mean rain. The instances where the widest variations exist usually can be explained.

In regard to the value of the theoretical rainfall, reference may again be made to the paper by Professor Curtis. He states (p. 8) that the Signal Service, in an investigation of the rainfall on the summit of Mount Washington to determine the local distribution and the average rainfall for the station, placed five gages on the summit of the mountain, one in the center and four to the four points of the compass 75 feet distant from it. It has been known for a long time that a gage placed at an elevation above ground usually recorded less than one placed on the ground below, this difference being caused by wind currents. The increased velocities of the wind around the corners and over the tops of the buildings, hills, or even the gage, tend to increase the slant of the falling rain at those points, and when just past the obstruction, the velocity of the wind being again reduced, a heavier fall of rain will be deposited. In this experiment on Mount Washington observations were made from September 1, 1882, to October 1, 1883. As the measurement of snow was reported as altogether unreliable, it was excluded. In the following table it is shown that the windward gages had received during this period 24.64 inches of rain and the leeward ones 28.43 inches, single storms showing greater variation. The conclusion reached is that precipitation varies materially within distances of only 100 or 200 feet.

The most remarkable feature of the experiment is the different results obtained from gages with 3-inch and 8-inch catchment cups. The gages that were set to the four points of the compass had 3-inch cups and the regular station gage had one 8-inch cup. For the period in question the four exterior gages recorded 45.82, 51.19, 45.40, and 42.63 inches, respectively, while the regular station gage recorded 58.70 inches of rain.

Comparative reading of 3-inch and 8-inch gages in wind.

	Wind velocity in miles per hour.							
	15		40		60		75	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
Diameter of gage	3	8	3	8	3	8	3	8
Amount of rain	1.75	1.84	2.77	3.37	1.60	2.44	1.87	3.49
Per cent	100	105	100	122	100	152	100	186

In view of these records, which are taken with experimental care, the statement would be justified that the "Probable rainfall," as shown in the table on page 351, agrees with the "Theoretical rainfall" as closely as it can be measured, the gages being of different makes and sizes.

The recorded rainfall of the Cuyamaca gage is probably in excess of the average rain for this elevation and the locality, and it is so considered by engineers in San Diego. The gage is in a narrow valley or canyon, and is probably affected by the winds and the topography.

It will be seen that Cisco, with an elevation of 5,934 feet, has a rainfall of 56.28 inches, while Summit, 13 miles beyond, with an elevation of 7,017, has only 46.99 inches of rain. It may be that this variation is due to the wind action, especially on the snow, which averages each year 31 feet in depth, or to the fact that Summit is above the plane of maximum rainfall, as mentioned on page 354.

TECOLOTE CREEK.

Discharge measurement of Tecolote Creek, Santa Barbara County.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
Aug. —	G. F. Wright	[a] 0.27

[a] Drainage area, 2 square miles.

TEJON CREEK.

See Fort Tejon Creek.

TEJON HOUSE CREEK.

Discharge measurements of Tejon House Creek, at Tejon Ranch House, Kern County.

Date.	Hydrographer.	Discharge.
1895.		*Sec.-feet.*
Mar. 6	J. B. Lippincott	22.7
Apr. 3	do	17.2
Sept. 4	A. P. Davis and J. B. Lippincott	1.57
Nov. 13	J. B. Lippincott	3.46
1896.		
Feb. 1	J. B. Lippincott	7.82
Feb. 2	do	18.3
June 4	do	6.09
June 5	do	8.31
Dec. 18	do	3.96
Dec. 19	do	2.66

TEMESCAL CREEK.

Discharge measurements of Temescal Creek at lower pipe line, Temescal Land and Water Company, Temescal, Riverside County, Cal.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
Jan. 28	F. Rolfe	0.66
Feb. 1	do	0.00
Feb. 11	do	.31
Feb. 15	do	1.39
Feb. 20	do	1.56
Mar. 4	do	4.22
Mar. 12	do	3.55
Mar. 18	do	2.69
Mar. 25	do	2.91
Mar. 31	do	3.42
Apr. 14	do	.89
Apr. 22	do	2.28
Apr. 29	do	2.28
May 6	do	4.46
May 13	do	2.55
May 30	do	3.08
June 9	do	3.10
June 15	do	2.36
July 4	do	2.87
July 19	do	2.03
July 25	do	2.49
Aug. 5	do	1.12
Aug. 11	do	2.40
Aug. 21	do	2.65

Discharge measurements of Temescal Creek at upper pipe line, Temescal Land and Water Company, Temescal, Riverside County.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
Jan. 4	S. G. Bennett	0.99
Jan. 27	F. Rolfe	.74
Feb. 4	do	1.62
Feb. 11	do	.87
Feb. 18	do	3.67
Feb. 24	do	3.37
Mar. 3	do	3.87
Mar. 12	do	5.10
Mar. 16	do	3.56
Mar. 25	do	3.74
Mar. 31	do	4.16
Apr. 14	do	2.93
Apr. 22	do	3.71
Apr. 29	do	3.22
May 6	do	2.80
May 13	do	4.02
May 18	do	4.21
May 30	do	4.01
June 9	do	3.36
June 16	do	3.52
July 10	do	3.21
July 19	do	3.20
July 25	do	3.67
Aug. 11	do	1.48
Aug. 11	do	4.26
Aug. 21	do	3.84

Discharge measurements of Evans ditch, Temescal Creek, Temescal, Riverside County.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
July 1		3.75
August		3.00

TORO CANYON.

Discharge measurement of Toro Canyon, Santa Barbara County.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
June 16	J. B. Lippincott	0.05

TRABUCO CREEK.

Discharge measurement of Trabuco Creek, Orange County.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
May 24	F. Rolfe	[a]1.08

[a] Ditch near San Juan Capistrano.

TRUCKEE RIVER.

TRUCKEE RIVER AT TAHOE, CAL.

Truckee River, the natural outlet of Lake Tahoe, leaves the lake at the city of Tahoe. About 500 feet from the lake there is a timber dam across the river, which has been maintained for more than twenty years for the purpose of controlling the discharge from the lake. During the early part of the year 1900 the gates in this dam were kept closed, not being opened until June 17, when a gage was placed in the stream for the purpose of recording the height of the water in the river. The gage is a vertical timber driven into the stream bed at the left bank, about 300 feet below the dam, and is spiked to the root of a tree growing on the bank. The bench mark is cut in the side of the tree, and is 4 feet above gage datum. The measurements are made from a cable and suspended car about one-fourth of a mile below the gage, which was placed as near the city of Tahoe as possible for the convenience of the observer. At the point of measurement the right bank is low, and is subject to overflow at very high stages of the stream, but the left bank is rather high. The channel is nearly straight for a short distance above and below the station, and the bed of the river, which is of gravel and coarse sand, is smooth and stable. The purpose of the station is to ascertain the actual outflow from Lake Tahoe, with a view to determining its value as a storage reservoir.

Discharge measurements of Truckee River at outlet of Lake Tahoe, Placer County.

Date.	Hydrographer.	Discharge.
1899.		*Sec.-feet.*
July 9		136
Aug. 8		75
Aug. 14		56
Aug. 18		49

Discharge measurements of Truckee River at Tahoe, Placer County.

Date.	Hydrographer.	Gage height.	Discharge.
1900.		*Feet.*	*Sec.-feet.*
June 18	L. H. Taylor	0.75	92
June 30	do	1.45	2.40
July 12	do	1.60	2.77
Sept. 7	do	1.40	225
Oct. 23	do	.40	52
Oct. 23	do	.95	130
Oct. 23	do	1.15	158
1901.			
Sept. 5	C. V. Taylor	1.94	386
Sept. 12	do	1.85	356
Nov. 11	do	1.57	296
Nov. 11	do	1.23	187
Nov. 11	do	1.00	141
1902.			
Oct. 22	E. C. Murphy		320

Discharge measurements of Truckee River one-half mile below Truckee.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
June 3		364
June 12		264

Estimated monthly discharge of Truckee River at Tahoe.

[Drainage area, 519 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
July	1,185	442	914	56,200	1.76	1.90
August	441	393	425	26,111	.82	.94
September	392	357	374	22,244	.72	.80
October	496	344	415	25,538	.80	.92
November	471	408	437	26,002	.84	.94
December	253	246	250	15,388	.48	.56
1896.						
January	293	244	262	16,102	.50	.58
February	292	288	290	16,677	.56	.60
1900.						
March	----------	----------	0	0	0	0
April	----------	----------	0	0	0	0
May	----------	----------	0	0	0	0
June	236	0	52	3,106	.10	.11
July	260	0	214	13,131	.41	.47
August	260	211	232	14,261	.45	.53
September	224	177	196	11,667	.38	.43
October	177	155	159	9,781	.31	.36
November	200	0	135	8,047	.26	.29
December	99	0	81	4,981	.16	.18
1901.						
January	117	85	102	6,262	.20	.23
February	117	30	81	4,502	.16	.16
March	30	30	30	1,845	.06	.07
April	30	0	9	565	.02	.02
May	0	0	0	0	0	0
June	178	0	30	1,765	.06	.06
July	293	156	225	13,809	.43	.50
August	555	293	419	25,760	.81	.93
September	390	117	326	19,395	.63	.70
October	308	251	282	17,308	.54	.63
November	293	189	247	14,678	.48	.53
December	189	100	111	6,841	.21	.25
The year	555	0	155	112,730	.30	4.08

Discharge measurements of tributaries of Truckee River at various points.

DEER CREEK, PLACER COUNTY.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
June 16		25.2

SQUAW CREEK, PLACER COUNTY.

1900.		
June 5		81.4
June 16		46.0
Sept. 14		2.76

DONNER CREEK, NEAR DONNER LAKE.

1900.		
May 16		127.8
May 29		73.4
July 13		1.09
Aug. 20		69.0
Sept. 13		19.2

DONNER CREEK, NEAR TRUCKEE RIVER.

1900.		
May 21		324.5
June 3		127.0
June 12		98.9
July 13		14.7
1902.		
Oct. 22	E. C. Murphy	3.25

COLD CREEK, NEVADA COUNTY.

1900.		
Sept. 13		1.35

Discharge measurements of tributaries of Truckee River, etc.—Continued.

MARTIS CREEK.

Date.	Hydrographer.	Discharge.
1889.		*Sec.-feet.*
June 1		19
June 22		7
1900.		
May 21		24.51
June 4		17.52
Sept. 14		8.54

JUNIPER CREEK AT CLINTON.

1889.		
May 30		22
1900.		
June 6		[a]30
Sept. 15		1.33

JOE GRAY CREEK AT ICELAND.

1889.		
May 31		88
1900.		
May 19		30
July 28		20.28
Sept. 15		12.28

ALDER CREEK AT FLORISTON.

1889.		
May 31		42
1900.		
May 19		[a]30
July 25		12.63
Sept. 10		10.29

[a] Estimated.

Discharge measurements of tributaries of Truckee River, etc.—Continued.

DOG VALLEY CREEK AT VERDI.

Date.	Hydrographer.	Discharge.
1889.		*Sec.-feet.*
May 22		7
1900.		
July 26		.40
Sept. 10		.79
1902.		
Oct. 7	D. W. Hays	7.14

TRUCKEE RIVER AT ESSEX, WASHOE COUNTY, NEV.

1889.		
May 20		2,330
May 21		2,570
May 22		2,510
May 29		1,716
June 20		350

SQUAW CREEK ABOUT HALFWAY FROM LAKE TAHOE.

1889.		
June 3		92
June 5		81.4
June 16		46
June 22		15
Sept. 14		2.76

CREEK NEAR TAHOE TOLLGATE.

1889.		
June 3		74

DONNER CREEK.

1889.		
July 3		8
July 6		5
July 11		2
July 16		1
Aug. 7		.9
Aug. 10		.2
Aug. 17		.3

Discharge measurements of tributaries of Truckee River, etc.—Continued.

COLD CREEK THREE-QUARTERS OF A MILE BELOW DONNER LAKE.

Date.	Hydrographer.	Discharge.
1889.		*Sec.-feet.*
June 28		11
July 3		10
July 6		5
July 11		1
Aug. 7		1
Aug. 10		1
Aug. 17		.7

PROSSER CREEK.

1900.		
June 4		[a] 145
July 27		[a] 25
Sept. 9		[a] 9.54
1902.		
Oct. 23	E. C. Murphy	[b] 21.24

LITTLE TRUCKEE RIVER AT BOCA.

1900.		
May 19		[c] 600
June 6		492
Aug. 16		8.94
Sept. 15		27.14

HUNTER CREEK.

1900.		
June 7		40.7
Sept. 12		5.93

INDEPENDENCE CREEK AT INDEPENDENCE LAKE.

1902.		
Oct. 24	E. C. Murphy	.27

[a] At mouth. [b] At Prosser. [c] Approximate.

Discharge measurements of streams flowing into Lake Tahoe.

WARD CREEK.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
May 5		147

BLACKWOOD CREEK.

1900.		
May 6		140

THREE SMALL STREAMS BETWEEN IDLEWILD AND MCKINNEY'S.

1900.		
May 6		[a] 12

M'KINNEY CREEK.

1900.		
May 6		150

GENERAL CREEK.

1900.		
May 7		100

MEIGGS CREEK.

1900.		
May 7		130

FIVE SMALL STREAMS BETWEEN MEEKS CREEK AND EMERALD BAY.

1900.		
May 7–8		[a] 12

EMERALD BAY CREEK.

1900.		
May 8		60

[a] Estimated.

Discharge measurements of streams flowing into Lake Tahoe—Continued.

CASCADE CREEK.

Date.	Hydrographer.	Discharge.
1900.		*Sec.-feet.*
May 8		30

TAYLOR CREEK.

1900.		
May 8		160

UPPER TRUCKEE RIVER.

1900.		
May 9		350

TEN SMALL STREAMS BETWEEN BIJOU AND GLEN BROOK IN NEVADA.

1900.		
May 10		[a]15

[a] Estimated.

TRUCKEE RIVER AT NEVADA-CALIFORNIA STATE LINE.

This river has its source on the slopes of the Sierra Nevada in eastern California and flows northward, entering Lake Tahoe. This lake is at an elevation of 6,225 feet, and is the largest body of fresh water in the United States at this considerable altitude. The area of the lake itself is 193 square miles. As the State line between Nevada and California passes through the lake, a portion of it is in each State. The outlet of the lake is at Tahoe, Cal., and Truckee River from this point has a general northward course, receiving a number of important tributaries which contribute to its flow. There are a number of lakes at the headwaters of the branch stream, which have been surveyed and recommended as reservoir sites. The drainage area is mapped on the Pyramid Peak, Truckee, Carson, and Markleeville atlas sheets of the United States Geological Survey. The basin is now partially included in the Lake Tahoe forest reserve, set apart by Executive proclamation of April 13, 1899. September 7, 1899, a station was established on this river by L. H. Taylor, at the State line, 17 miles west of Reno, Nev. The gage is vertical, driven into the bed of the river and wired to a granite bowlder. The bench mark

is the top of the rock to which the rod is fastened, and is at an elevation of 10 feet above gage datum. The channel is straight for a short distance above and below the station. The banks are not liable to overflow. The bed of the river is of gravel and cobbles and is quite stable.

Discharge measurements of Truckee River at State line.

Date.	Hydrographer.	Gage height.	Discharge.
1899.		*Feet.*	*Sec.-feet.*
Sept. 7	L. H. Taylor	2.0	303
1900.			
Apr. 10	L. H. Taylor	2.9	753
May 15	do	4.1	1,493
May 22	do	4.3	1,629
June 1	do	3.7	1,112
June 15	do	3.2	901
July 1	do	2.5	534
July 14	do	2.5	551
Sept. 6	do	2.3	447
Oct. 2	do	1.9	318
1901.			
Feb. 13	C. V. Taylor	1.5	298
Feb. 27	do	4.5	2,474
Mar. 11	do	3.4	1,262
June 9	do	3.9	1,741
July 13	do	2.6	811
Aug. 16	do	2.1	528
Sept. 3	do	2.2	570
Sept. 14	do	2.0	478
Nov. 9	do	1.95	437
Dec. 14	do	1.75	353
1902.			
Apr. 10	C. V. Taylor	.....	1,492
May 10	do	.....	2,384

Estimated monthly discharge of Truckee River at Nevada-California State line.

[Drainage area, 955 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
September 17–30	363	295	303	18,030	0.32	0.36
October	632	295	354	21,767	.37	.43
November	1,566	295	581	34,572	.61	.68
December	328	264	295	18,139	.31	.36
1900.						
January	897	295	392	24,103	0.41	0.47
February	363	264	318	17,661	.33	.34
March	1,131	295	797	49,006	.83	.96
April	1,409	735	902	53,673	.94	1.05
May	1,885	1,196	1,528	93,953	1.60	1.84
June	1,409	328	950	56,529	.99	1.10
July	533	401	459	28,223	.48	.55
August	486	328	396	24,349	.41	.47
September	486	205	367	21,838	.38	.42
October	897	234	481	29,575	.50	.58
November	897	328	480	28,562	.50	.56
December	1,131	205	407	25,025	.43	.50
The year	1,885	205	623	452,497	.65	8.80

TRUCKEE RIVER AT VISTA, NEV.

On the lower courses of this river there are considerable stretches of irrigable land which, however, have not yet been developed to their fullest extent. The drainage basin is peculiar in that its mountainous collecting area is located in the State of California, while the lands which can be irrigated are situated in Nevada. This may lead in the future to certain legal difficulties, but not to the extent that it would if there were agricultural lands in both States. Truckee River, after entering Nevada, flows in a general easterly and then northerly direction, emptying into Pyramid Lake. The drainage area is mapped on the Pyramid Peak, Truckee, Markleeville, Carson, Reno, and Wadsworth atlas sheets of the United States Geological Survey. The station at Vista, Nev., was established August 18, 1899, by L. H. Taylor, and is located 7 miles east of Reno. The rod is spiked to posts driven into the bed of the river. The bench mark is on a bluff of rock 500 feet east of the gage, and is at an elevation of 17.50 feet

above gage datum. A new bench mark was established March 14, 1901, on the top of a 2 by 2 inch plug driven 2 feet into the ground at the upper end of the inclined gage on the left bank. Its elevation is 9.60 feet above the datum of the gage. Both banks are high and not liable to overflow. The bed is rocky and not subject to change.

Discharge measurements of Truckee River at Vista, Nev.

[L. H. Taylor, hydrographer.]

Date.	Gage height.	Discharge.
1899.	*Feet.*	*Sec.-feet.*
September 5	2.0	105
October 28	2.75	477
1900.		
April 25	3.30	7.57
May 14	3.80	9.89
May 23	4.30	1,326
June 9	3.80	967
June 14	4.10	1,150
June 19	2.90	471
June 28	2.70	372
July 2	2.20	207
July 10	2.05	138
July 24	2.00	99
August 22	2.30	198
September 28	2.25	226
1901.		
February 22	6.35	3,077
March 14	3.85	[a] 899
March 20	3.88	[a] 911
June 21	4.10	1,165
July 12	2.70	417
August 15	2.20	198
September 2	2.50	325
September 14	2.40	276
November 13	3.05	584
December 15	2.78	448

[a] Results too small.

Estimated monthly discharge of Truckee River at Vista, Nev.

[Drainage area 1,519 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1890.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
April			4,496			
May			5,990			
June			4,162			
July			2,198			
August			952			
September			682			
October			742			
November			765			
December			750			
1891.						
January			[a] 700			
February			[a] 650			
March			[a] 650			
April			1,523			
May			2,765			
June			1,905			
July			945			
August			485			
September			558			
October			561			
November			503			
December			508			
The year			980			
1892.						
January			593			
February			505			
March			723			
April			854			
May			937			

[a] Estimated.

Estimated monthly discharge of Truckee River at Vista, Nev.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
August 18–31			114			
September	188	74	152	9,073	0.10	0.11
October	1,066	144	378	23,251	.25	.29
November	1,123	355	516	30,713	.34	.38
December	709	331	456	28,019	.30	.35
1900.						
January	1,210	380	479	29,445	0.32	0.36
February	529	380	426	23,671	.28	.29
March	1,094	454	857	52,668	.56	.65
April	1,239	479	756	44,982	.50	.56
May	1,477	843	1,257	77,289	.83	.95
June	1,239	259	709	42,201	.47	.52
July	307	74	110	6,746	.07	.08
August	283	61	122	7,513	.08	.09
September	283	105	192	11,449	.13	.14
October	1,123	258	430	26,456	.28	.33
November	1,298	331	566	33,660	.37	.42
December	1,268	429	554	34,049	.36	.42
The year	1,477	61	538	390,129	.35	4.81
1901.						
January	1,505	418	661	40,644	0.44	0.50
February	4,213	418	1,486	82,529	.98	1.02
March	2,209	938	1,328	81,657	.87	1.01
April	1,942	747	1,380	82,117	.91	1.01
May	4,213	1,410	2,145	131,894	1.42	1.63
June	1,942	854	1,263	75,155	.83	.93
July	995	146	425	26,133	.28	.32
August	492	128	315	19,369	.21	.23
September	467	251	329	19,577	.22	.24
October	720	370	477	29,330	.31	.36
November	882	467	557	33,144	.37	.41
December	1,287	322	510	31,357	.34	.39
The year	4,213	128	906	652,906	.60	8.05

TULE RIVER.

Tule River drains a portion of the western slope of the Sierra Nevada. Its watershed is somewhat less productive of run-off than that of Kaweah River, which joins it on the north, and much less elevated and snow covered than Kings River basin.

The waters of this stream are all appropriated during the irrigation season, and a portion of them are used in irrigating valuable orange lands in the vicinity of Porterville, Cal.

The gaging station is located about 8 miles east of Porterville, at a point just below the wagon bridge near the McFarland ranch, and about 1 mile above the mouth of the South Fork of Tule River. The station was established April 18, 1901. The gage rod is situated on the right bank of the river, 100 feet below the bridge. The zero of the gage is 8 feet below a spike driven into a large cottonwood tree. The area of the watershed above the gaging station is approximately 300 square miles.

Discharge measurements of Tule River.

Date.	Hydrographer.	Discharge.	Location.
		Sec.-feet.	
Nov. 18, 1895	J. B. Lippincott	32.1	In Pioneer canal.
Nov. 18, 1895	do	28.4	River below canal.
	Total	60.5	
Sept. 2, 1900	S. G. Bennett	4.3	Canal.
Sept. 2, 1900	do	4.7	River.
	Total	9.0	
Oct. 3, 1902	L. M. Lawson	7.0	Canal.
Oct. 3, 1902	do	8.2	River.
	Total	15.2	
Oct. 3, 1902	L. M. Lawson	14.0	At headworks, Pioneer canal.
Oct. 3, 1902	do	7.0	1 mile below intake, Pioneer canal.
July 19, 1901	A. E. Chandler	19.8	Below intake of Pioneer canal.
Oct. 3, 1902	L. M. Lawson	8.2	
May 23, 1901	W. N. Frickstad	152.0	Rockford Bridge, 6 miles west of Porterville.
June 28, 1901	A. E. Chandler	164.6	14 miles above Porterville.

Discharge measurements of Tule River, Tulare County.

Date.	Hydrographer.	Discharge.	Location.
1902.		*Sec.-feet.*	
Sept. 30	E. T. Perkins	2.6	Middle Fork, trail crossing below location of Doyle's headworks.
Sept. 30	do	14.0	Middle Fork 100 yards above head Doyles ditch.
Oct. 1	do	24.0	Middle Fork at trail crossing near junction with East Fork.
Oct. 1	do	15.0	East Fork 100 yards above mouth.
Oct. 3	do	10.0	East Fork at trail crossing Nelsons to Indian Reservation.
Oct. 2	do	3.0	South Fork 6 miles below Indian Agency.
Oct. 3	do	3.2	South Fork near Tom Wheaton's ranch.
Oct. 3	L. M. Lawson	(a)	South Fork at junction of North Fork.
Oct. 3	do	4.0	Pioneer canal at Porterville.

[a] Dry.

Discharge measurements of Tule River at McFarlands Bridge, above mouth of South Fork.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Apr. 18	S. G. Bennett	2.5	233
May 22	J. B. Lippincott	2.85	338
June 10	do	2.65	311
June 28	A. E. Chandler	2.00	148
July 29	S. G. Bennett	1.23	30
Oct. 18	do	1.00	18
Dec. 9	do	1.44	58
1902.			
Feb. 5	do	1.33	43
Mar. 8	do	2.2	156
May 15	do	3.03	371
Oct. 2	L. M. Lawson	.92	15

Discharge measurements of Lower Tule canal at Tulare Lake.

Date.	Hydrographer.	Discharge.
1901.		*Sec.-feet.*
June 24	A. E. Chandler	198.2

Discharge measurements of Pioneer canal, Tulare County.

Date.	Hydrographer.	Discharge.	Location.
1898.		*Sec.-feet.*	
Sept. 1	P. M. Baier	6.0	
1899.			
Sept. 5	S. G. Bennett	13.1	200 feet below headworks.
Sept. 5	do	8.43	1 mile below headworks.
Sept. 5	do	7.06	2 miles below headworks.
1902.			
Oct. 3	L. M. Lawson	14.0	At headworks.
Oct. 3	do	7.0	1 mile below headworks.

Discharge measurements of South Fork of Tule River at mouth, 7 miles east of Porterville, Tulare County.

Date.	Hydrographer.	Discharge.
1901.		*Sec.-feet.*
June 10	J. B. Lippincott	47.3
July 29	S. G. Bennett	[a].5
1902.		
May 15	do	103.0

[a] Estimated.

Estimated monthly discharge of Tule River at Porterville.[a]

[Drainage area, 437 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November			131	7,795	0.30	0.33
December			131	8,055	.30	.35
1879.						
January			57	3,505	0.13	0.15
February			87	4,832	.20	.21
March			61	3,751	.14	.16
April			118	7,021	.27	.30
May			105	6,456	.24	.28
June			350	20,826	.80	.89
July			35	2,152	.08	.09
August			26	1,599	.06	.07
September			26	1,547	.06	.07
October			74	4,550	.17	.20
November			140	8,330	.32	.36
December			271	16,663	.62	.71
The year			113	81,232	.25	3.49
1880.						
January			577	35,478	1.32	1.52
February			1,040	59,821	2.38	2.57
March			1,079	66,344	2.47	2.84
April			1,289	76,701	2.95	3.28
May			1,040	63,946	2.38	2.75
June			721	42,902	1.65	1.84
July			350	21,520	.80	.92
August			87	5,349	.20	.23
September			44	2,618	.10	.11
October			44	2,705	.10	.12
November			87	5,177	.20	.22
December			219	13,466	.50	.58
The year			548	396,027	1.25	16.98

[a] Authority, California State engineering department from November, 1878, to October, 1884.

Estimated monthly discharge of Tule River at Porterville—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1881.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			219	13,466	0.50	0.58
February			437	24,270	1.00	1.04
March			437	26,870	1.00	1.15
April			874	52,006	2.00	2.23
May			874	53,740	2.00	2.31
June			437	26,003	1.00	1.12
July			219	13,466	.50	.58
August			175	10,760	.40	.46
September			87	5,177	.20	.22
October			66	4,058	.15	.17
November			57	3,392	.13	.15
December			66	4,058	.15	.17
The year			329	237,266	.75	10.18
1882.						
January			87	5,349	0.20	0.23
February			109	6,053	.25	.26
March			306	18,815	.70	.81
April			660	39,273	1.51	1.68
May			1,748	107,480	4.00	4.61
June			660	39,273	1.51	1.68
July			437	26,870	1.00	1.15
August			131	8,055	.30	.35
September			66	3,927	.15	.17
October			44	2,705	.10	.12
November			66	3,927	.15	.17
December			66	4,058	.15	.17
The year			365	265,785	.83	11.40

Estimated monthly discharge of Tule River at Porterville—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1883.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			87	5,349	0.20	0.23
February			87	4,832	.20	.21
March			437	26,870	1.00	1.15
April			656	39,034	1.50	1.67
May			874	53,740	2.00	2.31
June			874	52,006	2.00	2.23
July			350	21,521	.80	.92
August			87	5,349	.20	.23
September			66	3,927	.15	.17
October			44	2,705	.10	.12
November			44	2,618	.10	.11
December			66	4,058	.15	.17
The year			306	222,009	.70	9.52
1884.						
January			262	16,109	0.60	0.69
February			1,748	100,546	4.00	4.31
March			1,311	80,610	3.00	3.46
April			874	52,006	2.00	2.23
May			2,185	134,350	5.00	5.76
June			3,059	182,023	7.00	7.81
July			2,622	161,220	6.00	6.92
August			874	53,740	2.00	2.31
September			350	20,826	.80	.89
October			175	10,760	.40	.46

Estimated monthly discharge of Tule River at McFarlands Bridge near Porterville, Tulare County.

[Drainage area, 437 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Sec.-feet.*
May	875	298	418	25,702	0.96	1.10
June	408	126	240	14,281	.55	.61
July	126	30	61	3,751	.14	.16
August	30	18	19	1,168	.04	.04
September	23	10	17	1,012	.04	.04
October	109	18	29	1,783	.07	.08
November	71	35	43	2,559	.10	.11
December	64	39	50	3,074	.11	.13
1902.						
January	51	34	45	2,767	.10	.12
February	1,415	45	159	8,830	.36	.37
March	2,735	144	362	22,259	.83	.95
April	4,615	249	571	33,977	1.31	1.46
May	408	273	343	21,090	.79	.91
June	324	78	190	11,306	.43	.48
July	78	26	43	2,644	.10	.12
August	33	18	21	1,291	.05	.06
September	17	14	15	893	.03	.03
October	93	14	24	1,476	.05	.06
November	144	27	50	2,975	.11	.12
December	204	45	62	3,812	.14	.16
The year	4,615	14	157	113,320	.36	4.84

TUMITUS CREEK.

Discharge measurement of Tumitus Creek, San Mateo County.

Date.	Hydrographer.	Discharge.
1893.		*Sec.-feet.*
Oct. 17	W. W. Brier	[a] 1.14

TUNIS CREEK.

Discharge measurement of Tunis Creek, Kern County.

Date.	Hydrographer.	Discharge.
1896.		*Sec.-feet.*
June 4	J. B. Lippincott	1.98
Dec. 15	do	.7

[a] At mouth.

TUOLUMNE RIVER.

HETCH HETCHY DAM SITE, HETCH HETCHY VALLEY.

The entire drainage of Tuolumne River above Lagrange is about 1,500 square miles, some 400 square miles of which lie above the Hetch Hetchy dam site, the elevation of which is 3,630 feet above sea level. This upper drainage area consists of high granite mountains culminating in Mount Dana, Mount Gibbs, and Mount Lyell.

A gaging station was established at this point May 30, 1901, by J. B. Lippincott, for the city of San Francisco.

For detailed description of Hetch Hetchy reservoir site see Twenty-first Annual Report of U. S. Geological Survey, Part IV, page 450.

Discharge measurements of Tuolumne River, Hetch Hetchy Valley, Tuolumne County.

Date.	Hydrographer.	Gage height.	Discharge.	Location.
1899.		*Feet.*	*Sec.-feet.*	
July 31	H. Ramel		238.0	
Aug. 5	do		230.0	
Aug. 12	do		131.0	
Aug. 19	do		101.0	
Aug. 23	do		69.0	
1901.				
Aug. 13	J. B. Lippincott and W. W. Cockins, jr.		472.0	Ford in Hetch Hetchy Valley.
Aug. 29	W. W. Cockins, jr	12.93	190.5	Do.
Sept. 5	do	12.65	155.7	Do.
Sept. 14	do	12.42	77.5	Do.
Oct. 5	do	12.92	115.6	Do.
Oct. 11	do	12.60	88.0	Do.
Aug. 25	do	13.28	231.3	1,000 feet above dam site.
Sept. 28	do	13.11	144.7	Do.
1902.				
Aug. 29	E. T. Perkins		66.0	Upper end Hetch Hetchy Valley.

Discharge measurements of Tuolumne River at Hetch Hetchy dam site.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
June 29	C. A. Miller and W. W. Cockins, jr	36.00	7,621.00
July 4	C. A. Miller	30.00	3,296.00
July 12	do	26.10	2,720.00
July 21	do	24.17	1,886.00
July 29	W. W. Cockins, jr	21.50	1,160.00
Aug. 2	do	20.33	1,137.00
Aug. 13	J. B. Lippincott	15.70	754.00
Sept. 20	W. W. Cockins, jr	12.32	66.12

Discharge measurements of Tuolumne River at old bridge above Rancheria Creek, Tuolumne County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
July 13	C. A. Miller		1,849
Aug. 26	W. W. Cockins, jr		160
Sept. 28	do		120
Oct. 11	do		60

Discharge measurements of Rancheria Creek (tributary to Tuolumne River) at old sheep bridge, Tuolumne County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Aug. 26	W. W. Cockins, jr		36.2
1902.			
Aug. 29	E. T. Perkins		[a]7.0

[a] At head of falls.

CHERRY RIVER AT ELEANOR TRAIL CROSSING.

Cherry River is a tributary of the Tuolumne and enters that stream 12½ miles below Hetch Hetchy Valley. The area drained is 130 square miles.

A gaging station was established at the point where Eleanor trail crosses the river, on May 26, 1901, by J. B. Lippincott, for the city of San Francisco.

Discharge measurements of Cherry Creek, a tributary of Tuolumne River, at Eleanor trail crossing.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
July 8	C. A. Miller	11.40	915.0
July 17	do	10.40	510.0
Aug. 9	W. W. Cockins, jr	8.75	112.0
Aug. 19	do	9.10	132.0
Aug. 20	do	8.40	107.0
Aug. 24	do	8.10	43.0
Sept. 1	do	7.80	17.5
Sept. 7	do	7.70	6.1
Sept. 17	do	7.00	4.3
Sept. 22	do	7.06	4.5
Sept. 26	do	9.05	141.0
Oct. 3	do	8.96	120.0
Oct. 10	do	8.00	43.0
1902.			
Aug. 30	E. T. Perkins		[a]4.4
Aug. 30	do		6.0

[a] 1,500 feet below trail crossing.

ELEANOR CREEK AT ELEANOR TRAIL CROSSING.

Eleanor Creek is a tributary of Cherry River and enters that stream 6 miles above its mouth. The elevation of the outlet of Lake Eleanor is 4,655 feet above sea level. The drainage area above the gaging station is 81 square miles, and consists of high granite mountains culminating in Richardson Peak, elevation 9,845 feet; Haystack Peak, elevation 9,966 feet; and an unnamed peak, elevation 10,510 feet. The average elevation of the drainage basin is probably 7,500 feet.

A gaging station was established at the outlet of Lake Eleanor June 1, 1901, by J. B. Lippincott, for the city of San Francisco.

For a detailed description of Lake Eleanor reservoir site see Thirteenth Annual Report of the U. S. Geological Survey, Part III, page 402.

Discharge measurements of Eleanor Creek at inlet to Lake Eleanor, Tuolumne County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
June 11	C. A. Miller		[a] 226.0
Do	do		[b] 74.0
	Total		300.0
July 16	C. A. Miller		[a] 121.0
Do	do		[b] 23.0
	Total		144.0
Aug. 18	W. W. Cockins, jr		[a] 75.0
Do	do		[b] 11.6
	Total		86.6
Aug. 27	W. W. Cockins, jr		[a] 8.3
Do	do		[b] 1.5
	Total		9.8
Oct. 1	W. W. Cockins, jr		[a] 47.6
Do	do		[b] 7.4
	Total		55.0

[a] West Branch. [b] East Branch.

Discharge measurements of Eleanor Creek at outlet of Lake Eleanor, Tuolumne County.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec. feet.*
June 10	C. A. Miller	8.67	411.0
June 22	do	9.76	793.0
July 8	J. B. Lippincott	8.57	310.0
July 16	C. A. Miller	7.92	263.0
July 18	do	7.80	225.0
July 27	W. W. Cockins, jr	7.45	145.0
Aug. 3	do	7.10	84.0
Aug. 10	do	6.92	75.0
Aug. 17	do	6.48	30.0
Aug. 19	do	6.68	42.0
Aug. 23	do	6.47	32.0
Aug. 27	do	6.26	17.8
Aug. 30	do	6.05	13.9

Discharge measurements of Eleanor Creek, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
1901.		*Feet.*	*Sec.-feet.*
Sept. 6	W. W. Cockins, jr	5.90	6.22
Sept. 14	do	5.70	4.08
Sept. 21	do	5.72	5.02
Sept. 26	do	5.85	5.77
Oct. 3	do	6.40	34.5
Oct. 10	do	6.21	21.2

Discharge measurements of Tuolumne River.

Date.	Hydrographer.	Discharge.	Location.
1902.		*Sec.-feet.*	
Aug. 22	E. T. Perkins	6.0	North Fork at headworks, Goldwin Mining Co.'s canal.
Aug. 27	do	152.0	⅛ mile above junction of South Fork.
Do	do	20.0	South Fork, ⅛ mile above junction of main river.
Aug. 29	do	.5	Tiltill Creek at trail crossing.
Do	do	89.0	Lower end Hetch Hetchy Valley.
Aug. 31	do	3.0	100 yards below bridge, Middle Fork.
Sept. 2	do	23.0	Above falls, lower end Tuolumne Meadows.
Aug. 25	do	22.0	Jacksonville.
Aug. 26	do	159.0	Ward's ferry.
Aug. 28	L. M. Lawson	150.0	Jacksonville, Tuolumne County.
Aug. 27	do	4.0	Mining Company's ditch at Lagrange, Stanislaus County.
Do	do	105.0	Turlock canal.

Discharge measurements of Frog Creek at inlet Eleanor Lake, Tuolumne County, Cal.

Date.	Hydrographer.	Discharge.	Location.
1901.		*Sec.-feet.*	
June 12	C. A. Miller	116.0	
July 17	do	33.	
Aug. 18	W. W, Cockins, jr	5.7	
Aug. 27	do	1.0	
Oct. 1	do	4.9	

Discharge measurements of Falls Creek at Lake Vernon (upper end), Tuolumne County, Cal.

Date.	Hydrographer.	Discharge.	Location.
1901.		*Sec.-feet.*	
Aug. 12	J. B. Lippincott	36.5	
Sept. 5	W. W. Cockins, jr.	9.8	Tiltill trail crossing.
Sept. 19	do	3.0	Do.
Oct. 4	do	16.0	Do.
1902.			
Aug. 29	E. T. Perkins	4.0	100 yards above junction with Tuolumne.

TUOLUMNE RIVER AT LAGRANGE.

This river rises on the western slope of the Sierra Nevada in California and drains the country located between Stanislaus River on the north and Merced River on the South. The northern half of the Yosemite National Park includes a portion of its drainage basin. The river is fed largely from small mountain lakes occurring high in the drainage basin, where snow remains on the mountain slopes throughout the year. The stream has a heavy fall, and the opportunities for power development are numerous. There are also a number of reservoir sites in the basin where water could be stored during the irrigation season. The gaging station, established August 29, 1895, is located at the wagon bridge in the town of Lagrange, Cal. The rod is vertical and is bolted to the right-hand pier of the bridge. The bench mark is a nail driven into the bottom of the west post of the fifth bent south of the south iron cylinder, and is 15.31 feet above gage datum. The station is located below the high dam of the Turlock and Modesto irrigation districts, and also below the head of the canal of the Lagrange Hydraulic Mining Company. This latter canal diverts water from the left bank of the river 14 miles above Lagrange dam. This water is used for hydraulic mining, and partly returns above the gaging station, depending on the convenience of the miners. During 1898 water was first turned down the Turlock Canal in small quantity, and was used for puddling the banks and testing dams of certain reservoirs. Whenever measurements at the gaging station were made, the Turlock Canal and the mining company's canal were also measured. The channel at the station, both above and below the bridge, is straight for several hundred feet, and the velocity of the stream is rather uniform. Both banks are high and not subject to overflow.

Discharge measurements of Tuolumne River at Lagrange, Stanislaus County.

Date.	Hydrographer.	Gage height.	Discharge.
1895.		*Feet.*	*Sec.-feet.*
Aug. 29	J. B. Lippincott	4.4	299.00
Sept. 14	do	5.8	1,824.00
Nov. 28	do	4.2	129.00
1896.			
Apr. 15	J. A. Vogleson	6.95	4,236.00
May 4	H. Crowe	7.0	4,004.00
June 17	do	9.3	8,274.00
Sept. 4	do	4.9	671.00
Oct. 30	J. B. Lippincott	4.45	361.00
1897.			
Feb. 15	do	5.8	1,864.00
May 29	do	9.25	11,594.00
July 12	A. Q. Campbell	5.7	1,839.00
Sept. 7	do	4.0	95.00
Oct. 30	do	4.73	534.00
Dec. 20	J. B. Lippincott	4.85	614.00
1898.			
May 31	do	5.9	1,887.00
Apr. 18	do	7.18	5,762.00
July 30	do	3.95	103.00
Oct. 7	do	4.2	[a] 30.00 [b] 24.00 [c] 83.00
	Total		137.00
1899.			
Mar. 3	J. B. Lippincott	5.0	774.00
Apr. 20	S. G. Bennett	7.55	5,712.00
Apr. 21	do	7.85	6,943.00
May 19	do	6.72	3,616.00
June 6	do	8.47	8,964.00
June 29	do	6.15	2,347.00
Aug. 3	do	3.70	23.00
Sept. 11	do	3.58	[c] 12.00 [a] 29.00 [b] 24.00
	Total		65.00

[a] Turlock Canal. [b] La Grange Ditch and Hydraulic Mining Company's Canal. [c] River.

Discharge measurements of Tuolumne River, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
1900.			
April 5	S. G. Bennett	6.08	[a] 2,286.00 [b] 129.00 [c] 24.00
	Total		2,439.00
May 20	S. G. Bennett	8.4	8,720.00
June 22	do	7.09	[c] 4,629.00 [a] 9.50 [b] 12.50
	Total		4,651.00
Aug. 11	S. G. Bennett		[c] 17.00 [a] 117.00 [b] 12.00
	Total		146.00
Sept. 8	S. G. Bennett		[a] 35.00 [b] 9.05 [c] 10.90
	Total		54.95
Dec. 27	S. G. Bennett	5.32	964.00
1901.			
Jan. 29	S. G. Bennett	5.75	1,419.00
Apr. 7	do	6.10	[c] 2,382.00 [b] 7.00
	Total		2,389.00
June 12	J. B. Lippincott	7.63	6,470.00
Aug. 2	S. G. Bennett	5.45	1,354.00
Aug. 31	do	4.30	248.00
1902.			
Mar. 6	S. G. Bennett	6.00	[c] 2,351.00 [a] 103.00 [b] 5.00
	Total		2,459.00

[a] River. [b] Turlock Canal. [c] La Grange Ditch and Hydraulic Mining Company's canal.

Discharge measurements of Tuolumne River, etc.—Continued.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
May 13	S. G. Bennett	8.35	[a] 9,476.00 [b] 253.00 [c] 5.00
	Total		9,734.00
Aug. 27	L. M. Lawson		[a] 15.00 [b] 105.00 [c] 4.00
	Total		124.00

[a] River. [b] Turlock Canal. [c] La Grange Ditch and Hydraulic Mining Company's canal.

Estimated monthly discharge of Tuolumne River exclusive of canals at Lagrange, Stanislaus County.

[Drainage area 1,501 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
August						
September	2,182	78	263	15,635	0.18	0.20
October	299	78	134	8,231	.09	.10
November	129	112	113	6,698	.08	.08
December	1,004	129	270	16,614	.18	.21
1896.						
January	7,610	350	2,312	142,159	1.54	1.78
February	1,780	1,080	1,164	66,954	.78	.84
March	11,798	1,006	2,725	167,578	1.82	2.10
April	7,990	2,670	3,522	209,574	2.34	2.60
May	10,100	2,670	4,429	272,371	2.95	3.40
June	9,320	5,140	7,692	457,705	5.13	5.74
July	5,330	960	3,003	184,677	2.00	2.31
August	3,050	227	485	29,828	.32	.37
September	1,620	132	432	25,742	.29	.32
October	350	75	120	7,366	.08	.09
November	5,710	227	1,135	67,543	.75	.83
December	3,620	670	1,083	66,603	.72	.83
The year [a]	11,798	75	2,342	1,698,100	1.56	21.21

[a] During 1896 there was no water in the Turlock Canal, and the Lagrange Ditch and Hydraulic Mining Company's Canal was flowing 32 second-feet approximately. The Lagrange Ditch and Hydraulic Mining Company's Canal was flowing approximately 35 second-feet during 1895.

Estimated monthly discharge of Tuolumne River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1897.	*Sec.-feet.*	*Sec. feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	3,930	660	1,231	75,692	0.82	0.94
February	13,200	1,840	5,172	287,238	3.45	3.59
March	10,800	2,500	4,032	247,920	2.69	3.10
April	13,500	3,280	7,735	460,263	5.15	5.75
May	14,700	9,600	11,923	733,121	7.94	9.15
June	9,300	2,500	5,673	337,566	3.78	4.22
July	4,840	480	2,181	134,105	1.45	1.67
August	570	76	237	14,573	.16	.18
September	140	28	86	5,117	.06	.07
October	750	76	222	13,650	.15	.17
November	3,540	260	768	45,699	.51	.57
December	4,060	570	1,104	67,883	.74	.85
The year [a]	14,700	28	3,364	2,422,827	2.24	30.26
1898.						
January	750	300	454	27,916	0.30	0.35
February	2,500	300	900	49,983	.60	.63
March	2,060	750	1,224	75,261	.82	.94
April	7,800	1,270	4,014	238,849	2.67	2.78
May	6,960	2,280	4,620	284,075	3.08	3.55
June	3,280	750	2,247	133,705	1.50	1.73
July	750	88	277	17,032	.19	.21
August	100	76	85	5,226	.06	.07
September	88	0	20	1,190	.01	.01
October	88	32	52	3,197	.03	.04
November	82	16	39	2,321	.03	.03
December	2,060	32	256	15,741	.17	.20
The year [b]	7,800	0	1,182	854,496	.79	10.54

[a] There was no discharge from the Turlock Canal during the year 1897 past the Lagrange gaging station; it was wasted into the river above. For flow of the Lagrange Ditch and Hydraulic Mining Company's Canal, see special measurements of that canal.

[b] During the year 1898 the Turlock Canal was not discharging any material amount of water past the Lagrange gaging station, and the Lagrange Ditch and Hydraulic Mining Company's Canal was carrying about 24 second-feet.

Estimated monthly discharge of Tuolumne River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,940	110	487	29,945	0.32	0.37
February	1,440	410	740	41,098	.49	.51
March	21,800	570	3,616	222,341	2.41	2.78
April	8,040	2,285	5,193	309,004	3.46	3.86
May	8,680	2,080	4,513	277,495	3.01	3.47
June	9,960	2,285	6,660	360,594	4.04	4.51
July	2,490	330	1,010	62,103	.67	.77
August	570	45	145	8,916	.10	.11
September	45	15	33	1,964	.02	.02
October	2,285	5	505	31,051	.34	.39
November	6,400	660	2,428	144,476	1.62	1.81
December	8,040	850	3,047	187,354	2.03	2.04
The year [a]	21,800	5	2,315	1,676,341	1.54	20.64
1900.						
January	13,160	1,060	2,384	146,586	1.59	1.83
February	1,300	750	967	53,704	.64	.67
March	3,100	950	2,343	144,065	1.56	1.80
April	4,320	1,440	2,389	142,155	1.59	1.77
May	9,320	3,100	6,796	417,870	4.53	5.23
June	8,680	2,285	5,291	314,836	3.53	3.94
July	1,740	140	694	42,672	.46	.53
August	140	0	43	2,644	.03	.03
September	110	0	11	655	.01	.01
October	5,760	35	1,228	75,507	.82	.94
November	14,440	410	2,536	150,902	1.69	1.89
December	2,080	850	1,332	81,902	.89	1.02
The year [b]	14,440	0	2,160	1,573,498	1.45	19.66

[a] For record of discharge of Turlock Canal beginning July 1, 1899, see Turlock Canal. Lagrange Ditch and Hydraulic Mining Company's Canal discharged about 24 second-feet during the year.

[b] For discharge of Turlock Canal for 1900 see Turlock Canal. Lagrange Ditch and Hydraulic Mining Company's Canal, January 1 to June 23, 24 second-feet; from June 24 to October 20, 12 second-feet; and from October 21 to December 31, 10 second-feet.

Estimated monthly discharge of Tuolumne River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1901.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	18,280	560	3,351	206,145	2.23	2.57
February	19,240	1,440	7,204	400,090	4.80	5.00
March	7,080	2,080	3,720	228,733	2.48	2.86
April	7,080	1,740	3,961	235,696	2.64	2.94
May	13,160	4,075	8,036	494,114	5.35	6.18
June	13,160	4,900	9,387	558,566	6.25	6.97
July	9,960	1,440	3,701	227,566	2.47	2.85
August	2,080	200	784	48,206	.52	.60
September	350	55	175	10,413	.12	.13
October	1,590	0	211	12,974	.14	.16
November	1,300	300	574	34,155	.38	.43
December	5,800	200	1,339	82,332	.89	1.02
The year [a]	19,240	0	3,537	2,538,990	2.37	31.71
1902.						
January	850	200	352	21,644	0.23	0.26
February	6,780	250	1,443	80,140	.96	1.00
March	5,810	1,180	2,103	129,308	1.40	1.61
April	12,630	1,320	4,735	281,752	3.15	3.51
May	11,360	2,470	6,334	389,462	4.22	4.86
June	11,360	3,140	6,519	387,907	4.34	4.84
July	2,690	350	998	61,365	.66	.76
August	300	0	91	5,595	.06	.07
September	200	35	89	5,296	.06	.07
October	560	15	113	6,948	.08	.09
November	2,690	250	676	40,225	.45	.50
December	2,690	350	809	49,743	.54	.62
The year	12,630	0	2,022	1,459,385	1.35	18.19

[a] Record for Turlock Canal for 1901 is incomplete. The Lagrange Ditch and Hydraulic Mining Company's Canal discharged from January 1 to March 31, 10 second-feet; April 1 to July 28, 7 second-feet, and flow was not material after that.

Discharge measurements of Lagrange Ditch and Hydraulic Mining Company's Canal.

Date.	Hydrographer.	Discharge.
1896.		*Sec.-feet.*
Apr. 15	J. A. Vogleson	32.0
1897.		
May 29	J. B. Lippincott	22.0
Oct. 30	A. Q. Campbell	6.2
Dec. 20	J. B. Lippincott	24.0
1898.		
Apr. 18	J. B. Lippincott	[a]30.0
May 31	do	26.0
July 30	do	24.0
Oct. 7	do	24.0
1899.		
Mar. 3	J. B. Lippincott	24.0
Apr. 21	S. G. Bennett	23.5
June 29	do	24.0
Aug. 3	do	24.0
Sept. 11	do	24.0
1900.		
Apr. 5	S. G. Bennnett	24.0
June 22	do	12.5
Aug. 11	do	12.0
1901.		
Apr. 7	S. G. Bennett	7.2
Aug. 31	do	4.5

[a] Estimated.

Discharge measurements of Turlock canal, Lagrange, Stanislaus County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.
1897.		*Feet.*	*Sec.-ft.*
Sept. 7	A. Q. Campbell		43.0
1898.			
Oct. 7	J. B. Lippincott		30.0
1899.			
Apr. 21	S. G. Bennett		10.0
May 20	do		61.0
June 6	do		10.0
June 29	do	0.75	18.0
Aug. 4	do	1.70	85.0
Sept. 9	do	1.0	29.0
1900.			
Apr. 6	S. G. Bennett	2.0	129.0
June 22	do	.50	9.5
Aug. 11	do	1.90	117.0
Sept. 8	do	1.15	35.0
1901.			
Aug. 31	S. G. Bennett	.0	.0
1902.			
May 13	S. G. Bennett	2.92	253.0
July 23	do	3.0	260.0
Aug. 27	L. M. Lawson	2.6	105.0

Estimated monthly discharge of Turlock canal at Lagrange, Stanislaus County.

Month.	Discharge.		
	Maximum.	Minimum.	Mean.
1899.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*
July	48	1	11
August	86	1	55
September	34	8	19
October	10	1	7
November	3	0	1
December	0	0	0
1900.			
January	0	0	0
February	133	28	62
March	133	64	84
April	133	0	90
May	133	133	133
June	133	9	71
July	133	0	120
August	133	0	57
September	36	0	26
October	0	0	0
November	0	0	0
December	0	0	0
The year	133	0	54
1902.			
January	0	0	0
February	0	0	0
March	286	0	187
April	360	0	268
May	380	0	325
June	420	400	406
July	460	215	405
August	367	105	287
September	47	0	0
October	0	0	0
November	0	0	0
December	0	0	0
The year	460	0	156

Discharge measurements of Tuolumne River at Modesto, Stanislaus County.

Date.	Hydrographer.	Gage height.	Discharge.
1895.		*Feet.*	*Sec.-ft.*
Jan. 8	J. B. Lippincott	7.7	3,003
Mar. 21	do	6.75	2,429
May 1	do	10.25	6,078
May 2	do	12.9	13,546
June 27	do	13.0	9,308
Aug. 27	A. P. Davis	4.0	294
Nov. 30	J. B. Lippincott	3.42	213
1896.			
Apr. 14	J. A. Vogleson	7.9	3,745
July 4	C. C. Babb	9.6	3,719
Sept. 5	H. Crowe	4.5	362
Oct. 31	J. B. Lippincott	3.92	375

Estimated monthly discharge of Tuolumne River at Modesto, Stanislaus County.[a]

[Drainage area, 1,635 square miles.]

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1878.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
November			65	3,868	0.04	0.04
December			65	3,996	.04	.05
1879.						
January			478	29,391	0.29	0.33
February	14,230		1,876	104,187	1.15	1.20
March	6,920	830	2,797	171,980	1.71	1.97
April	8,360	2,350	4,456	265,150	2.73	3.04
May	8,230	2,740	5,086	312,726	3.11	3.59
June	11,870	4,670	7,061	420,158	4.32	4.79
July	4,670	570	1,977	121,560	1.21	1.39
August			183	11,252	.11	.13
September			39	2,321	.02	.02
October			30	1,844	.02	.02
November			101	6,010	.06	.07
December	4,790	140	903	55,523	.55	.63
The year			2,082	1,502,102	1.27	17.18

[a] Authority, California State engineering department from 1878 to 1884, inclusive.

Estimated monthly discharge of Tuolumne River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1880.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	1,290	170	409	25,148	0.25	0.29
February	5,150	130	625	35,950	.38	.41
March	1,550	370	832	51,157	.51	.59
April	19,300	770	7,141	424,918	4.37	4.87
May	16,300	6,280	10,371	637,687	6.34	7.31
June	17,050	10,340	14,075	837,521	8.61	9.61
July	13,220	3,295	7,618	468,412	4.66	5.37
August	2,960	300	1,233	75,814	.75	.86
September			134	7,973	.08	.09
October			56	3,443	.03	.03
November			35	2,082	.02	.02
December	5,020		1,095	67,328	.67	.77
The year			3,635	2,637,433	2.22	30.22
1881.						
January	22,900	2,640	2,884	177,330	1.76	2.03
February	5,020	2,440	6,755	375,153	4.13	4.30
March	10,340	3,290	2,879	177,022	1.76	2.03
April	10,200	4,790	6,260	372,495	3.83	4.27
May	8,630	3,540	7,274	447,261	4.45	5.13
June	3,970	690	5,225	310,909	3.20	3.57
July	1,380		1,996	122,729	1.22	1.41
August			391	24,041	.24	.28
September			125	7,437	.08	.09
October			130	7,993	.08	.09
November			193	11,484	.12	.13
December			620	38,122	.38	.44
The year			2,894	2,071,976	1.77	23.77

Estimated monthly discharge of Tuolumne River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1882.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January			620	38,122	0.38	0.44
February	1,360		573	31,823	.35	.36
March	11,410	430	2,164	133,059	1.32	1.52
April	5,780	2,270	3,543	210,823	2.17	2.42
May	11,250	4,670	7,461	458,759	4.56	5.26
June	13,670	4,550	8,046	478,770	4.92	5.49
July	5,650	890	2,745	168,783	1.68	1.94
August			574	35,294	.35	.40
September			255	13,388	.14	.16
October			873	43,678	.53	.61
November			570	33,917	.35	.39
December			327	20,106	.20	.23
The year			2,310	1,666,522	1.41	19.22
1883.						
January			654	40,211	0.40	0.46
February			490	27,213	.30	.31
March			1,310	80,548	.80	.92
April			3,270	194,578	2.00	2.23
May			8,180	502,968	5.00	5.76
June			6,540	389,157	4.00	4.46
July			1,635	100,532	1.00	1.15
August			490	30,129	.30	.35
September			327	19,457	.20	.22
October			262	16,110	.16	.18
November			327	19,457	.20	.22
December			327	20,106	.20	.23
The year			1,984	1,440,466	1.21	16.49
1884.						
January			410	25,210	0.25	0.29
February			490	28,185	.30	.32
March			6,540	402,129	4.00	4.61
April			7,360	437,950	4.50	5.02
May			7,360	452,548	4.50	5.20
June			8,180	486,743	5.00	5.58
July			6,540	402,129	4.00	4.61
August			1,635	100,532	1.00	1.15
September			327	19,457	.20	.22
October			245	15,064	.15	.17

Estimated monthly discharge of Tuolumne River, etc.—Continued.

Month.	Discharge.			Total discharge.	Run-off.	
	Maximum.	Minimum.	Mean.		Per square mile.	Depth.
1895.	*Sec.-feet.*	*Sec.-feet.*	*Sec.-feet.*	*Acre-feet.*	*Sec.-feet.*	*Inches.*
January	16,130	1,398	4,828	296,900	3.22	3.70
February	19,650	1,322	3,915	217,430	2.61	2.72
March	10,785	1,710	3,165	194,610	2.11	2.43
April	10,012	3,255	5,824	346,570	3.88	4.33
May	16,000	6,097	11,798	725,400	7.87	9.07
June	12,530	5,616	9,163	545,110	6.11	6.82
July	6,692	1,550	3,831	235,540	2.55	2.94
August	1,550	285	848	52,125	.57	.65
September	5,616	200	615	36,600	.41	.46
October	200	120	152	9,346	.10	.12
November	500	210	255	14,985	.17	.19
December	730	180	283	17,405	.19	.22
The year	19,650	120	3,719	2,692,021	2.45	33.65
1896.						
January	13,868	246	3,080	189,370	2.05	2.37
February	1,880	950	1,182	68,007	.79	.86
March	11,798	1,006	2,725	167,578	1.82	2.10
April	14,873	1,970	3,577	212,828	2.38	2.66
May	14,754	2,550	5,180	318,500	3.45	3.98
June	14,754	6,990	11,648	693,104	7.09	7.87
July	8,735	1,306	4,121	253,408	2.75	3.17
August	1,118	300	575	35,392	.38	.44
September	2,918	220	574	34,191	.38	.43
October	474	180	224	13,797	.15	.17
November	7,802	273	1,210	72,012	.81	.90
December	3,560	516	1,028	63,247	.69	.79
The year	14,754	180	2,927	2,121,434	1.90	25.74

TWIN CREEKS.

Discharge measurements of East Twin Creek in Canyon, San Bernardino County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
1898.		
June 11	J. B. Lippincott	[a] 1.95
		[b] .11
	Total	2.06
Sept. 9	J. B. Lippincott	[a] .43
Sept. 9	do	[b] .30
	Total	.73
1899.		
Mar. 24	S. G. Bennett	[a] 3.88
Mar. 24	do	[b] .50
	Total	4.38
Aug. 25	S. G. Bennett	[a] .58
Aug. 25	do	[b] .16
	Total	.74
1900.		
July 12	S. G. Bennett	[a] .62
		[b] .15
	Total	.77
Oct. 1	W. W. Cockins, jr	[a] .36
		[b] .21
	Total	.57
1902.		
Apr. 4	S. G. Bennett	[c] 4.7
		[b] .2
	Total	4.9
Sept. 4	W. B. Clapp	.4

[a] Ditch. [b] Tunnel. [c] Creek.

Discharge measurements of West Twin Creek in Canyon, San Bernardino County.

Date.	Hydrographer.	Discharge.
1898.		*Sec.-feet.*
June 11	J. B. Lippincott	[a] 1.06
		[b] .68
		[c] .40
	Total	2.14
Sept. 9	J. B. Lippincott	.38
1899.		
Mar. 21	S. G. Bennett	3.00
Aug. 25	do	.20
1900.		
July 12	do	.22
Oct. 1	W. W. Cockins, jr	.16
1902.		
Apr. 4	S. G. Bennett	3.20
Sept. 4	W. B. Clapp	.13

[a] Pipe line to Waterman Ranch. [b] Flume to Settlers. [c] Hot Springs at Old Ranch.

WALKER RIVER.

Discharge measurements of Walker River, East Fork.

Date.	Hydrographer.	Discharge.	Location.
1902.		*Sec.-feet.*	
July 24	L. H. Taylor	196.5	10 miles below Bridgeport.
Aug. 27	D. W. Hays	79.5	Lower end Bridgeport Valley.
Oct. 6	do	57.6	Below all diversions in California.
July 26	F. H. Olmsted	119.8	Robinson Creek below Twin Lakes.
Aug. 21	D. W. Hays	75.7	Do.
Do	do	43.2	Buckeye Creek west of Bridgeport.
Oct. 6	do	24.0	Robinsons Creek, Twin Lakes.
Do	do	20.0	Buckeye Creek, Buckeye Springs.
Oct. 7	do	4.2	Somers, southwest of Bridgeport.
Do	do	7.12	Green Creek above Standard Dam.
Oct. 5	do	5.7	Virginia Creek bridge at Huntoon Ranch.

Discharge measurements of Walker River, West Fork.

Date.	Hydrographer.	Discharge.	Location.
1902.		*Sec.-feet.*	
July 22	F. H. Olmsted	417.0	3 miles above Larsens.
Do	do	15.5	Silver Creek.
July 23	do	10.5	Quinton Creek.
Do	do	71.5	Leavitt.
July 24	do	95.0	At Middle Fork.
July 25	L. H. Taylor	330.6	Upper end Antelope Valley.
Aug. 23	D. W. Hays	69.7	Do.
Oct. 4	do	69.8	Do.
Aug. 8	do	221.8	Bridge above tollhouse.

Discharge measurement of Big Walker River, Leavitts, Mono County.

Date.	Hydrographer.	Discharge.	Location.
1896.		*Sec.-feet.*	
Oct. 18	J. B. Lippincott	45	

Discharge measurement of Little Walker River, Hardys, Mono County.

Date.	Hydrographer.	Discharge.	Location.
1896.		*Sec.-feet.*	
Oct. 17	J. B. Lippincott	39	
1902.			
July 24.	F. H. Olmsted	101.6	Blackburns Junction.

WARD AND WARREN DITCH.

See San Bernardino Valley.

WARM CREEK.

WARM CREEK, HAWES AND TALMADGE DITCH.

See San Bernardino Valley.

WARM CREEK, M'KENZIE DITCH.

See San Bernardino Valley.

WARM CREEK, MEEKS AND DAILY DITCH.

See San Bernardino Valley.

WARM CREEK, RABEL DITCH (DAM).

See San Bernardino Valley.

WARM CREEK, SHAY OR STOUT DITCH.

See San Bernardino Valley.

WHITE CREEK.

Estimated monthly discharge of White Creek at base of foothills, Tulare County.[a]

[Drainage area, 90 square miles.]

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1879.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	7	430	0.08	0.09
February	12	666	.14	.14
March	6	369	.07	.08
April	23	1,368	.25	.28
May	16	984	.18	.21
June	5	297	.06	.07
July	0		0	0
August	0		0	0
September	0		0	0
October	0		0	0
November	23	1,368	.25	.28
December	45	2,767	.50	.58
The year	11	8,249	.13	1.73

[a] The entire record is estimated from records of neighboring drainage basins. Authority, California State engineering department.

Estimated monthly discharge of White Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1880.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	108	6,640	1.20	1.38
February	207	11,906	2.30	2.48
March	234	14,388	2.60	3.00
April	261	15,530	2.90	3.24
May	180	11,067	2.00	2.31
June	45	2,677	.50	.56
July	5	307	.06	.07
August	0		0	0
September	0		0	0
October	0		0	0
November	18	1,071	.20	.22
December	45	2,767	.50	.58
The year	92	66,353	1.02	13.84
1881.				
January	45	2,767	0.50	0.58
February	90	4,998	1.00	1.04
March	90	5,534	1.00	1.15
April	90	5,355	1.00	1.12
May	90	5,534	1.00	1.15
June	45	2,677	.50	.56
July	0		0	0
August	0		0	0
September	0		0	0
October	0		0	0
November	0		0	0
December	11	676	.12	.14
The year	38	27,541	.42	5.74

Estimated monthly discharge of White Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1882.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	11	676	0.12	0.14
February	14	777	.15	.16
March	45	2,767	.50	.58
April	45	2,677	.50	.56
May	9	553	.10	.12
June	0		0	0
July	0		0	0
August	0		0	0
September	0		0	0
October	9	553	.10	.12
November	14	833	.15	.17
December	5	307	.06	.07
The year	13	9,143	.14	1.92
1883.				
January	14	861	0.15	0.17
February	14	777	.15	.16
March	72	4,427	.80	.92
April	45	2,677	.50	.56
May	36	2,213	.40	.46
June	0		0	0
July	0		0	0
August	0		0	0
September	0		0	0
October	9	553	.10	.12
November	9	535	.10	.11
December	14	861	.15	.17
The year	18	12,904	.19	2.67

Estimated monthly discharge of White Creek, etc.—Continued.

Month.	Mean discharge.	Total discharge.	Run-off.	
			Per square mile.	Depth.
1884.	*Second-feet.*	*Acre-feet.*	*Second-feet.*	*Inches.*
January	45	2,767	0.50	0.58
February	270	15,530	3.00	3.24
March	270	16,601	3.00	3.45
April	180	10,710	2.00	2.23
May	36	2,213	.40	.46
June	45	2,677	.50	.56
July	0		0	0
August	0		0	0
September	0		0	0
October	0		0	0

WHITEWATER RIVER.

Discharge measurements of Whitewater River and tributaries at various points, San Bernardino and Riverside counties.

Date.	Hydrographer.	Discharge.	Locality
		Sec.-feet.	
Feb. 15, 1898	J. B. Lippincott	7.42	South Fork at tunnel.
Mar. 4, 1899	do	2.52	Do.
Feb. 16, 1898	do	14.24	Main river at foot of Bear Valley trail.
Feb. 17, 1898	do	4.64	North Fork at mouth.
Do	do	.82	Middle Fork at mouth.
Do	do	17.77	Main river 2 miles above mouth.

Discharge measurements of Bear Valley Ditch, Riverside County.

Date.	Hydrographer.	Discharge.	Locality.
		Sec.-feet.	
Feb. 17, 1898	J. B. Lippincott	3.05	¼ mile northeast of ranch house.
Sept. 28, 1899	do	5.20	At headgate.
Sept. 29, 1899	do	2.49	1 mile below headgate.

Discharge measurements of Bear Valley and Palm Spring joint headworks, mouth of Canyon, Riverside County.

Date.	Hydrographer.	Discharge.
		Sec.-feet.
Sept. 7, 1898	J. B. Lippincott	9.35
Aug. 25, 1899	S. G. Bennett	6.34

WHITING DITCH.

See San Bernardino Valley.

WILLOW CREEK.

See Susan River.

YUBA RIVER.

Discharge measurements of Yuba River.

Date.	Hydrographer.	Discharge.	Locality
1878.		*Sec.-feet.*	
Dec. 9	State engineering department.	510	Marysville.
Dec. 12	do	510	3 miles below Smartsville.
1879.			
Feb. 14	do	18,000	Marysville.
Mar. 6	do	25,750	Do.
Mar. 9	do	11,500	Do.
Mar. 12	do	9,500	Do.
Mar. 19	do	7,000	Do.
Aug. 28	do	600	Smartsville to Marysville.

Discharge measurements of Yuba River below Parks Bar Bridge, Smartsville, Yuba County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.
1900.		*Feet.*	*Sec.-feet.*
June 28	H. D. H. Connick	3.15	1,212
June 29	do	2.95	1,086
July 11	do	2.65	820
July 12	do	2.65	811
July 13	do	2.60	774
July 22	do	2.42	622
July 23	do	2.50	686
July 24	do	2.50	673
Aug. 7	do	2.23	537
Aug. 8	do	2.30	571
Aug. 14	do	2.25	534
Aug. 28	do	2.20	474
Sept. 14	do	2.60	736
1902.			
Sept. 1	Chas. A. Miller		487

Discharge measurements of Yuba River, North Fork, above power company's dam, Yuba County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.
1900.		*Feet.*	*Sec.-feet.*
July 3	H. D. H. Connick	2.05	606
July 6	do	1.95	567
July 17	do	1.70	438
July 18	do	1.65	419
July 27	do	1.65	366
July 29	do	1.60	371
July 31	do	1.60	364
Aug. 9	do	1.55	328
Aug. 10	do	1.57	322
Aug. 29	do	1.48	282
Aug. 30	do	1.48	285

Discharge measurements of Yuba River, Middle Fork, at Freemans Bridge, Yuba County, Cal.

Date.	Hydrographer.	Gage height.	Discharge.
1900.		*Feet.*	*Sec.-feet*
July 1	H. D. H. Connick	2.40	191
July 3	do	2.35	180
July 4	do	2.30	185
July 7	do	2.57	162
July 29	do	2.30	109
Aug. 11	do	2.17	79
Aug. 12	do	2.15	78
Aug. 29	do	2.20	69
Aug. 30	do	2.20	68
Sept. 18	do	2.15	64

Discharge measurements of Yuba River, Yuba County, Cal.

Date.	Hydrographer.	Discharge.	Locality.
1902.		*Sec.-feet.*	
Aug. 29	S. G. Bennett	58	South Fork, at Eldorado bridge.
Aug. 30	Chas. A. Miller	55	South Fork, at Bridgeport bridge.
Sept. 1	do	32	Excelsior Mining and Irrigation canal, at Pleasant Valley.
	Total	87	
Aug. 29	S. G. Bennett	58	South Fork, 75 feet above Edwards bridge.
Do	do	9.3	South Fork, North Columbia, Eureka Lake Company's canal.
Do	do	7.0	South Fork, North Bloomfield ditch.
Aug. 30	do	52	Middle Fork, ¼ mile below Delihi mine.
Sept. 1	do	64	Middle Fork, 300 feet below Freemans bridge.
Do	do	221	North Fork, Bay Counties Electric Co.'s flume, below headgate.

MAXIMUM FLOOD MEASUREMENTS.

The following flood measurements are given as having probable interest to the engineer in connection with the designing of bridges and of spillways for reservoirs. It is not intended that these should be considered as the maximum floods that will ever occur on these drainage basins. They are rather given as a record of the largest observed volumes known to the author. It is, of course, exceedingly difficult to measure accurately a river in great flood, and it seldom falls to the fortune of a hydrographer to be present at the maximum flood wave, but it is believed that these data may be valuable for the purposes mentioned:

Gila River at Florence, Ariz., February, 1891; 17,750 square miles drainage area; discharge, 102,500 second-feet, or 7.5 second-feet per square mile.

Salt River, Arizona, February, 1891; area of drainage, 12,000 square miles; flood discharge, 300,000 second-feet, or 24.6 second-feet per square mile.

Gila River at Gila bend, February, 1891, probable flood discharge, 250,000 second-feet.

Mormon Canyon, Los Angeles County, 15½ square miles drainage; elevation from 1,000 to 3,800; flood discharge by Schuyler from 700 to 800 second-feet, or 48.5 second-feet per square mile.

Sweetwater River, 186 square miles drainage area; January, 1895, 18,150 second-feet, or 97.5 second-feet per square mile.

Tuolumne River at La Grange dam, drainage area, 1,501 square miles; elevations to 14,000 feet; flood discharge, 46,000 second-feet, or 30.6 second-feet per square mile.

Yuba River, South Fork, at Bowman dam, elevation, 5,500 feet; drainage area, 19 square miles; discharge, 5,000 to 7,000 second-feet from melting snow, or 316 second-feet per square mile.

Cherry Creek, Colorado, area, 175 square miles; flood discharge, 10,000 second-feet, or 57 second-feet per square mile.

Maximum floods measured by the United States Geological Survey, 1896–1901.

Date.	Stream.	Locality.	Area of watershed	Maximum measurements.	Discharge per square mile
			Sq. miles.	*Sec.-feet.*	*Sec. feet*
	Arroyo Seco (Salinas).	Above diversion	218	24,050	110.23
1885	Kern	Near Bakersfield	2,345	9,380	4.00
1901	King	Red Mountain	1,742	43,930	25.21
1901	Mokelumne	Electra	640	13,213	20.64
1896	Sacramento	Jellys Ferry	9,134	130,050	14.23
1900	San Antonio	Near Jolon (above Pinkerton dam site).	322	15,315	47.56
1901	San Gabriel	Azusa	222	6,250	28.15
1901	San Joaquin	Herndon	1,637	21,372	13.05
1900	San Lorenzo		235	10,269	42.00
1900	Santa Ana	Warm Spring	188	1,564	8.32
1899	Stanislaus	Oakdale	1,051	13,940	13.26
1900	Stony Creek	Julian's ranch	760	[a] 18,000	23.76+
1899	Tuolumne	Lagrange	1,501	21,800	14.52

[a] Gage height, 14. February, 1902, gage height reached 15.7.

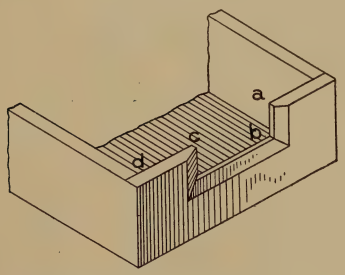


FIG. 4.—Figure showing construction of weir.

It has been found that the usual method of measuring the head on weirs, as practiced by water companies and water users, is to use an ordinary foot rule divided into inches and sixteenths. As no general weir table is available for heads so measured, the following has been prepared.

WEIR

The following conditions should be observed in construction of weir: depth of box or canal, and distance *c d* of opening from side of canal

Discharges in second-feet, rectangular weirs

[Formula Q = 3.33

	Head.		Length of weir.											
	Inches.	Feet.	4 in.	6 in.	9 in.	12 in.	15 in.	18 in.	24 in.	2 ft. 6 in.	3 ft.	3 ft. 6 in.	4 ft.	4 ft. 6 in.
1	1/16	0.005	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	1/8	.010	0.0011	0.0017	0.0026	0.00353	.....	.....	.....	.....	.....	.....	.....	.....
3	3/16	.015	.0021	.0032	.0048	.00648	.....	.....	.....	.....	.....	.....	.....	.....
4	1/4	.021	.0033	.0050	.0075	.00997	0.0125	0.0150	0.0200	0.0250	0.0300	0.0350	0.0400	0.0450
5	5/16	.026	.0046	.0069	.0104	.0139	.0174	.0209	.0279	.0349	.0419	.0489	.0559	.0629
6	3/8	.031	.0060	.0091	.0137	.0183	.0229	.0275	.0367	.0459	.0551	.0643	.0735	.0827
7	7/16	.036	.0075	.0114	.0172	.0230	.0288	.0346	.0462	.0578	.0694	.0810	.0926	.104
8	1/2	.042	.0092	.0139	.0210	.0281	.0352	.0422	.0564	.0706	.0847	.0989	.113	.127
9	9/16	.047	.0110	.0166	.0250	.0335	.0419	.0504	.0673	.0842	.101	.118	.135	.152
10	5/8	.052	.0128	.0194	.0293	.0392	.0491	.0590	.0788	.0986	.118	.138	.158	.178
11	11/16	.057	.0147	.0223	.0337	.0451	.0566	.0680	.0908	.114	.136	.159	.182	.205
12	3/4	.062	.0167	.0254	.0384	.0514	.0644	.0774	.103	.129	.155	.181	.207	.233
13	13/16	.068	.0187	.0285	.0432	.0579	.0725	.0872	.117	.146	.175	.205	.234	.263
14	7/8	.073	.0209	.0318	.0482	.0646	.0810	.0974	.130	.163	.196	.229	.261	.294
15	15/16	.078	.0231	.0352	.0534	.0716	.0897	.108	.144	.181	.217	.253	.290	.326
16	1	.083	.0254	.0387	.0587	.0788	.0988	.119	.159	.199	.239	.279	.319	.359
17	1 1/16	.088	.0277	.0423	.0642	.0862	.108	.130	.174	.218	.262	.305	.349	.393
18	1 1/8	.094	.0301	.0460	.0699	.0938	.118	.142	.189	.237	.285	.333	.381	.428
19	1 3/16	.099	.0325	.0498	.0757	.102	.128	.153	.205	.257	.309	.361	.413	.464
20	1 1/4	.104	.0349	.0536	.0816	.110	.138	.166	.222	.278	.334	.389	.445	.501
21	1 5/16	.109	.0375	.0576	.0877	.118	.148	.178	.238	.298	.359	.419	.479	.539
22	1 3/8	.115	.0401	.0616	.0939	.126	.159	.191	.255	.320	.385	.449	.514	.578
23	1 7/16	.120	.0427	.0657	.100	.135	.169	.204	.273	.342	.411	.480	.549	.618
24	1 1/2	.125	.0454	.0699	.107	.144	.180	.217	.291	.364	.438	.511	.585	.659
25	1 9/16	.130	.0481	.0742	.113	.152	.192	.231	.309	.387	.465	.544	.622	.700
26	1 5/8	.135	.0508	.0784	.120	.161	.203	.244	.327	.410	.493	.576	.659	.742
27	1 11/16	.140	.0536	.0829	.127	.171	.215	.259	.346	.434	.522	.610	.698	.785
28	1 3/4	.146	.0564	.0873	.134	.180	.226	.273	.365	.458	.551	.644	.736	.829
29	1 13/16	.151	.0593	.0919	.141	.190	.238	.287	.385	.483	.581	.678	.776	.874
30	1 7/8	.156	.0622	.0965	.148	.199	.251	.302	.405	.508	.611	.714	.816	.919
31	1 15/16	.161	.0651	.101	.155	.209	.263	.317	.425	.533	.641	.749	.857	.965
32	2	.167	.0680	.106	.162	.219	.276	.332	.446	.559	.672	.786	.899	1.012
33	2 1/16	.172	.0710	.111	.170	.229	.288	.348	.466	.585	.704	.822	.941	1.060
34	2 1/8	.177	.0740	.115	.177	.239	.301	.364	.488	.612	.736	.860	.984	1.108
35	2 3/16	.182	.0769	.120	.185	.250	.315	.379	.509	.638	.768	.898	1.027	1.157
36	2 1/4	.187	.0799	.125	.193	.260	.328	.395	.531	.666	.801	.936	1.071	1.206
37	2 5/16	.193	.0830	.130	.201	.271	.341	.412	.553	.694	.834	.975	1.116	1.257
38	2 3/8	.198	.0862	.135	.208	.282	.355	.428	.575	.722	.868	1.015	1.161	1.308
39	2 7/16	.203	.0893	.140	.216	.293	.369	.445	.597	.750	.902	1.055	1.207	1.359
40	2 1/2	.208	.0924	.145	.224	.303	.383	.462	.620	.778	.937	1.095	1.253	1.412
41	2 9/16	.213	.....	.150	.233	.315	.397	.479	.643	.808	.972	1.136	1.300	1.465
42	2 5/8	.219	.....	.155	.241	.326	.411	.496	.667	.837	1.007	1.178	1.348	1.518
43	2 11/16	.224	.....	.161	.249	.337	.425	.514	.690	.867	1.043	1.219	1.396	1.572
44	2 3/4	.229	.....	.166	.257	.349	.440	.531	.714	.897	1.079	1.262	1.444	1.627

TABLES.

The depth *a b* of weir (fig. 4, see p. 411) must not be over one-third must not be less than depth *a b*.

with end contractions; original computation.

(L —.2 H) $H^{\frac{3}{2}}$.]

Length of weir—Continued.											Addition for increase of length.		
5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	1 in.	1 ft.	
													1
											0.00029	0.00354	2
											.00054	.00650	3
0.0500	0.0600	0.0700	0.0800	0.0900	0.100	0.120	0.140	0.160	0.180	0.200	.00083	.01001	4
.0698	.0838	.0978	.112	.126	.140	.168	.196	.224	.252	.280	.00117	.0140	5
.0918	.110	.129	.147	.166	.184	.221	.258	.294	.331	.368	.00153	.0184	6
.116	.139	.162	.185	.209	.232	.278	.324	.371	.417	.463	.00193	.0232	7
.141	.170	.198	.226	.255	.283	.340	.396	.453	.510	.566	.00236	.0283	8
.169	.203	.236	.270	.304	.338	.405	.473	.541	.608	.676	.00282	.0338	9
.198	.237	.277	.316	.356	.395	.475	.554	.633	.712	.791	.00330	.0396	10
.228	.273	.319	.365	.410	.456	.547	.639	.730	.821	.913	.00380	.0457	11
.260	.312	.364	.416	.468	.520	.624	.728	.832	.936	1.040	.00433	.0520	12
.293	.351	.410	.469	.527	.586	.703	.821	.938	1.055	1.173	.00489	.0587	13
.327	.392	.458	.524	.589	.655	.786	.917	1.048	1.179	1.310	.00546	.0656	14
.362	.435	.509	.582	.654	.726	.872	1.017	1.162	1.308	1.453	.00606	.0727	15
.399	.479	.559	.640	.720	.800	.960	1.120	1.280	1.441	1.601	.00667	.0801	16
.437	.525	.613	.700	.788	.876	1.051	1.227	1.402	1.578	1.753	.00731	.0877	17
.476	.572	.667	.763	.859	.954	1.145	1.337	1.528	1.719	1.910	.00796	.0956	18
.516	.620	.724	.827	.931	1.035	1.242	1.449	1.657	1.864	2.071	.00864	.104	19
.557	.669	.781	.893	1.005	1.117	1.341	1.565	1.789	2.013	2.237	.00933	.112	20
.600	.720	.841	.961	1.081	1.202	1.443	1.684	1.925	2.166	2.407	.01005	.120	21
.643	.772	.901	1.030	1.160	1.289	1.547	1.805	2.064	2.322	2.580	.0108	.129	22
.687	.825	.963	1.101	1.239	1.377	1.654	1.930	2.206	2.482	2.758	.0115	.138	23
.732	.879	1.026	1.174	1.321	1.468	1.762	2.057	2.351	2.645	2.940	.0123	.147	24
.778	.935	1.091	1.248	1.404	1.561	1.874	2.186	2.499	2.812	3.125	.0130	.156	25
.825	.991	1.157	1.323	1.489	1.655	1.967	2.319	2.650	2.982	3.314	0138	.166	26
.873	1.049	1.224	1.400	1.576	1.751	2.102	2.454	2.805	3.156	3.507	.0146	176	27
.922	1.107	1.293	1.478	1.664	1.849	2.220	2.591	2.962	3.333	3.704	.0155	185	28
.971	1.167	1.362	1.558	1.753	1.949	2.340	2.731	3.122	3.513	3.904	.0163	.195	29
1.022	1.228	1.433	1.639	1.845	2.050	2.462	2.873	3.284	3.696	4.107	0171	.206	30
1.073	1.289	1.505	1.721	1.937	2.153	2.586	3.018	3.450	3.882	4.314	.0180	.216	31
1.125	1.352	1.579	1.805	2.032	2.258	2.711	3.165	3.618	4.071	4.524	.0189	.227	32
1.178	1.416	1.653	1.890	2.127	2.365	2.839	3.314	3.788	4.263	4.737	.0198	.237	33
1.232	1.480	1.728	1.976	2.225	2.473	2.969	3.465	3.962	4.458	4.954	.0207	.248	34
1.286	1.546	1.805	2.064	2.323	2.582	3.101	3.619	4.138	4.656	5.174	.0216	.259	35
1.342	1.612	1.882	2.153	2.423	2.693	3.234	3.775	4.316	4.856	5.397	.0225	.270	36
1.398	1.680	1.961	2.243	2.525	2.806	3.370	3.933	4.497	5.060	5.623	.0235	.282	37
1.455	1.748	2.041	2.334	2.627	2.921	3.507	4.093	4.680	5.266	5.853	.0244	.293	38
1.512	1.817	2.122	2.427	2.731	3.036	3.646	4.256	4.865	5.475	6.085	.0254	.305	39
1.570	1.887	2.203	2.520	2.837	3.153	3.787	4.420	5.053	5.686	6.320	.0264	.317	40
1.629	1.958	2.286	2.615	2.943	3.272	3.929	4.586	5.244	5.901	6.558	.0274	.329	41
1.689	2.029	2.370	2.711	3.051	3.392	4.074	4.755	5.436	6.118	6.799	.0284	.341	42
1.749	2.102	2.455	2.808	3.161	3.514	4.219	4.925	5.631	6.337	7.043	.0294	.353	43
1.810	2.175	2.540	2.906	3.271	3.636	4.367	5.098	5.828	6.559	7.290	.0304	.365	44

Discharges in second-feet, rectangular

	Head.		Length of weir.											
	Inches.	Feet.	4 in.	6 in.	9 in.	12 in.	15 in.	18 in.	24 in.	2 ft. 6 in.	3 ft.	3 ft. 6 in.	4 ft.	4 ft. 6 in.
45	2 3/8	0.234	.....	0.171	0.266	0.360	0.455	0.549	0.738	0.927	1.116	1.305	1.494	1.683
46	2 7/8	.240	.....	.177	.274	.372	.469	.567	.762	.958	1.153	1.348	1.543	1.739
47	2 1/16	.245	.....	.182	.283	.384	.484	.585	.787	.989	1.190	1.392	1.594	1.795
48	3	.250	.....	.187	.291	.395	.499	.604	.812	1.020	1.228	1.436	1.644	1.852
49	3 1/16	.255	.....	.193	.300	.407	.515	.622	.837	1.051	1.266	1.481	1.695	1.910
50	3 1/8	.260	.....	.198	.309	.420	.530	.641	.862	1.083	1.305	1.526	1.747	1.968
51	3 3/16	.266	.....	.204	.318	.432	.546	.660	.888	1.116	1.343	1.571	1.799	2.027
52	3 1/4	.271	.....	.209	.327	.444	.561	.679	.913	1.148	1.383	1.617	1.852	2.087
53	3 5/16	.276	.....	.205	.336	.456	.577	.698	.939	1.181	1.422	1.664	1.905	2.147
54	3 3/8	.281	.....	.220	.345	.469	.593	.717	.966	1.214	1.462	1.711	1.959	2.207
55	3 7/16	.286	.....	.226	.354	.481	.609	.737	.992	1.247	1.502	1.758	2.013	2.268
56	3 1/2	.292	.....	.232	.363	.494	.625	.756	1.018	1.281	1.543	1.805	2.068	2.330
57	3 9/16	.297	.....	.....	.372	.507	.641	.776	1.045	1.315	1.584	1.853	2.123	2.392
58	3 5/8	.302	.....	.....	.381	.520	.658	.796	1.072	1.349	1.625	1.902	2.178	2.455
59	3 11/16	.307	.....	.....	.391	.532	.674	.816	1.100	1.383	1.667	1.950	2.234	2.518
60	3 3/4	.312	.....	.....	.400	.545	.691	.836	1.127	1.418	1.709	2.000	2.291	2.581
61	3 13/16	.318	.....	.....	.409	.558	.708	.857	1.155	1.453	1.751	2.049	2.347	2.646
62	3 7/8	.323	.....	.....	.419	.572	.724	.877	1.183	1.488	1.794	2.099	2.405	2.710
63	3 15/16	.328	.....	.....	.428	.585	.741	.898	1.211	1.524	1.837	2.150	2.463	2.775
64	4	.333	.....	.....	.438	.598	.758	.919	1.239	1.559	1.880	2.200	2.521	2.841
65	4 1/16	.338	.....	.....	.448	.612	.776	.940	1.267	1.595	1.923	2.251	2.579	2.907
66	4 1/8	.344	.....	.....	.457	.625	.793	.961	1.296	1.632	1.967	2.303	2.638	2.974
67	4 3/16	.349	.....	.....	.467	.638	.810	.982	1.325	1.668	2.011	2.355	2.698	3.041
68	4 1/4	.354	.....	.....	.477	.652	.828	1.003	1.354	1.705	2.056	2.407	2.758	3.109
69	4 5/16	.359	.....	.....	.486	.666	.845	1.025	1.383	1.742	2.101	2.459	2.818	3.177
70	4 3/8	.365	.....	.....	.496	.680	.863	1.046	1.413	1.779	2.146	2.512	2.879	3.245
71	4 7/16	.370	.....	.....	.506	.693	.881	1.068	1.442	1.817	2.191	2.565	2.940	3.314
72	4 1/2	.375	.....	.....	.516	.707	.899	1.090	1.472	1.854	2.237	2.619	3.001	3.384
73	4 9/16	.380	.....	.....	.....	.721	.917	1.112	1.502	1.892	2.283	2.673	3.063	3.454
74	4 5/8	.385	.....	.....	.....	.735	.935	1.134	1.532	1.930	2.329	2.727	3.126	3.524
75	4 11/16	.390	.....	.....	.....	.749	.953	1.156	1.562	1.969	2.375	2.782	3.188	3.595
76	4 3/4	.396	.....	.....	.....	.764	.971	1.178	1.593	2.008	2.422	2.837	3.252	3.666
77	4 13/16	.401	.....	.....	.....	.778	.989	1.201	1.624	2.047	2.469	2.892	3.315	3.738
78	4 7/8	.406	.....	.....	.....	.793	1.009	1.224	1.655	2.086	2.517	2.949	3.380	3.811
79	4 15/16	.411	.....	.....	.....	.807	1.028	1.246	1.686	2.125	2.565	3.004	3.444	3.883
80	5	.417	.....	.....	.....	.821	1.045	1.269	1.717	2.164	2.612	3.060	3.508	3.956
81	5 1/16	.422	.....	.....	.....	.836	1.064	1.292	1.748	2.205	2.661	3.117	3.573	4.030
82	5 1/8	.427	.....	.....	.....	.850	1.082	1.315	1.779	2.244	2.709	3.174	3.638	4.103
83	5 3/16	.432	.....	.....	.....	.864	1.101	1.337	1.810	2.284	2.757	3.230	3.703	4.177
84	5 1/4	.437	.....	.....	.....	.879	1.120	1.361	1.843	2.324	2.806	3.288	3.770	4.252
85	5 5/16	.443	.....	.....	.....	.893	1.138	1.383	1.874	2.364	2.855	3.345	3.836	4.326
86	5 3/8	.448	.....	.....	.....	.908	1.158	1.407	1.906	2.405	2.904	3.404	3.903	4.402
87	5 7/16	.453	.....	.....	.....	.923	1.177	1.431	1.939	2.447	2.954	3.462	3.970	4.478
88	5 1/2	.458	.....	.....	.....	.938	1.196	1.455	1.971	2.488	3.005	3.521	4.038	4.555
89	5 9/16	.463	.....	.....	.....	.953	1.216	1.479	2.004	2.530	3.055	3.581	4.106	4.632
90	5 5/8	.469	.....	.....	.....	.968	1.235	1.502	2.037	2.571	3.105	3.640	4.174	4.708
91	5 11/16	.474	.....	.....	.....	.983	1.255	1.526	2.070	2.613	3.156	3.700	4.243	4.786
92	5 3/4	.479	.....	.....	.....	.998	1.274	1.550	2.103	2.655	3.207	3.760	4.312	4.864
93	5 13/16	.484	.....	.....	.....	1.014	1.295	1.575	2.137	2.698	3.259	3.821	4.382	4.943
94	5 7/8	.490	.....	.....	.....	1.029	1.314	1.599	2.170	2.740	3.310	3.881	4.451	5.021

weirs with end contractions—Continued.

Length of weir—Continued.											Addition for increase of length.		
5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	1 in.	1 ft.	
1.871	2.249	2.627	3.005	3.383	3.761	4.516	5.272	6.028	6.783	7.539	0.0315	0.378	45
1.934	2.324	2.715	3.105	3.496	3.886	4.667	5.448	6.229	7.010	7.792	.0325	.391	46
1.997	2.400	2.804	3.207	3.610	4.013	4.820	5.627	6.433	7.240	8.047	.0336	.403	47
2.060	2.477	2.893	3.309	3.725	4.142	4.974	5.807	6.639	7.472	8.304	.0347	.416	48
2.125	2.554	2.983	3.413	3.842	4.271	5.130	5.989	6.847	7.706	8.565	.0358	.429	49
2.190	2.632	3.075	3.517	3.960	4.402	5.287	6.172	7.058	7.943	8.828	.0369	.443	50
2.255	2.711	3.167	3.623	4.079	4.535	5.446	6.358	7.270	8.182	9.093	.0380	.456	51
2.321	2.791	3.260	3.729	4.199	4.668	5.607	6.546	7.484	8.423	9.362	.0391	.469	52
2.388	2.871	3.354	3.837	4.320	4.803	5.769	6.735	7.701	8.666	9.632	.0402	.483	53
2.455	2.952	3.449	3.946	4.442	4.939	5.932	6.926	7.919	8.913	9.906	.0414	.497	54
2.524	3.034	3.545	4.055	4.566	5.076	6.097	7.118	8.140	9.161	10.182	.0425	.511	55
2.592	3.117	3.641	4.166	4.690	5.215	6.264	7.313	8.362	9.411	10.460	.0437	.525	56
2.661	3.200	3.739	4.277	4.816	5.355	6.432	7.509	8.586	9.664	10.741	.0449	.539	57
2.731	3.284	3.837	4.390	4.943	5.495	6.601	7.707	8.813	9.918	11.024	.0461	.553	58
2.801	3.369	3.936	4.503	5.070	5.638	6.772	7.907	9.041	10.176	11.310	.0473	.567	59
2.872	3.454	4.036	4.617	5.199	5.781	6.944	8.108	9.271	10.435	11.598	.0485	.582	60
2.944	3.540	4.136	4.733	5.329	5.925	7.118	8.311	9.503	10.696	11.889	.0497	.596	61
3.016	3.627	4.238	4.849	5.460	6.071	7.293	8.515	9.737	10.960	12.182	.0509	.611	62
3.088	3.714	4.340	4.966	5.592	6.218	7.470	8.722	9.973	11.225	12.477	.0522	.626	63
3.162	3.802	4.443	5.084	5.725	6.366	7.648	8.929	10.211	11.493	12.774	.0534	.641	64
3.235	3.891	4.547	5.203	5.859	6.515	7.827	9.139	10.451	11.763	13.074	.0547	.656	65
3.310	3.981	4.652	5.323	5.994	6.665	8.007	9.350	10.692	12.034	13.376	.0559	.671	66
3.384	4.071	4.757	5.443	6.130	6.816	8.189	9.562	10.935	12.308	13.681	.0572	.686	67
3.460	4.161	4.863	5.565	6.267	6.969	8.373	9.776	11.180	12.584	13.988	.0585	.702	68
3.535	4.253	4.970	5.688	6.405	7.122	8.557	9.992	11.427	12.862	14.296	.0598	.717	69
3.612	4.345	5.078	5.811	6.544	7.277	8.743	10.209	11.676	13.142	14.608	.0611	.733	70
3.689	4.438	5.186	5.935	6.684	7.433	8.930	10.428	11.926	13.423	14.921	.0624	.749	71
3.766	4.531	5.296	6.060	6.825	7.590	9.119	10.648	12.178	13.707	15.237	.0637	.765	72
3.844	4.625	5.405	6.186	6.967	7.748	9.309	10.870	12.432	13.993	15.554	.0650	.781	73
3.922	4.719	5.516	6.313	7.110	7.906	9.500	11.093	12.687	14.281	15.874	.0664	.797	74
4.001	4.814	5.627	6.440	7.253	8.066	9.692	11.318	12.944	14.570	16.196	.0677	.813	75
4.081	4.910	5.739	6.569	7.398	8.227	9.886	11.545	13.203	14.862	16.520	.0691	.829	76
4.161	5.007	5.852	6.698	7.544	8.390	10.081	11.772	13.464	15.155	16.847	.0705	.846	77
4.242	5.104	5.967	6.829	7.691	8.553	10.278	12.002	13.727	15.451	17.176	.0719	.862	78
4.323	5.201	6.080	6.959	7.838	8.717	10.475	12.233	13.990	15.748	17.506	.0732	.879	79
4.404	5.299	6.195	7.090	7.986	8.882	10.673	12.464	14.256	16.047	17.838	.0747	.896	80
4.486	5.398	6.311	7.223	8.136	9.048	10.873	12.698	14.523	16.348	18.173	.0760	.912	81
4.568	5.497	6.427	7.356	8.285	9.215	11.074	12.933	14.791	16.650	18.509	.0775	.929	82
4.650	5.596	6.543	7.489	8.436	9.382	11.275	13.168	15.061	16.954	18.846	.0789	.946	83
4.733	5.697	6.661	7.624	8.588	9.551	11.479	13.406	15.333	17.260	19.187	.0803	.964	84
4.816	5.797	6.778	7.759	8.740	9.721	11.682	13.644	15.606	17.567	19.529	.0817	.981	85
4.901	5.899	6.897	7.895	8.894	9.892	11.888	13.885	15.881	17.877	19.874	.0832	.998	86
4.986	6.002	7.017	8.033	9.049	10.064	12.096	14.127	16.159	18.190	20.221	.0846	1.016	87
5.071	6.105	7.138	8.171	9.204	10.238	12.304	14.371	16.438	18.504	20.571	.0861	1.033	88
5.157	6.208	7.259	8.310	9.361	10.412	12.514	14.616	16.718	18.820	20.922	.0876	1.051	89
5.243	6.312	7.380	8.449	9.518	10.586	12.724	14.861	16.999	19.136	21.273	.0891	1.069	90
5.329	6.416	7.503	8.589	9.676	10.762	12.936	15.109	17.282	19.455	21.628	.0906	1.087	91
5.416	6.521	7.626	8.730	9.835	10.939	13.149	15.358	17.567	19.776	21.985	.0921	1.105	92
5.504	6.627	7.750	8.872	9.995	11.117	13.363	15.608	17.853	20.098	22.343	.0935	1.123	93
5.592	6.733	7.873	9.014	10.155	11.295	13.577	15.858	18.140	20.421	22.702	.0951	1.141	94

Discharges in second-feet, rectangular

	Head.		Length of weir.											
	Inches.	Feet.	4 in.	6 in.	9 in.	12 in.	15 in.	18 in.	24 in.	2 ft. 6 in.	3 ft.	3 ft. 6 in.	4 ft.	4 ft. 6 in.
95	5 15/16	0.495				1.044	1.334	1.624	2.203	2.783	3.362	3.942	4.521	5.101
96	6	.500				1.060	1.354	1.649	2.237	2.826	3.415	4.003	4.592	5.181
97	6 1/16	.505					1.374	1.673	2.271	2.869	3.467	4.065	4.662	5.260
98	6 1/8	.510					1.394	1.697	2.304	2.912	3.519	4.126	4.733	5.340
99	6 3/16	.515					1.414	1.722	2.339	2.955	3.572	4.188	4.805	5.421
100	6 1/4	.521					1.434	1.747	2.372	2.999	3.624	4.250	4.876	5.502
101	6 5/16	.526					1.455	1.772	2.407	3.043	3.678	4.313	4.948	5.584
102	6 3/8	.531					1.475	1.798	2.442	3.087	3.732	4.377	5.021	5.666
103	6 7/16	.536					1.495	1.822	2.476	3.131	3.785	4.439	5.093	5.747
104	6 1/2	.542					1.516	1.848	2.511	3.175	3.839	4.503	5.166	5.830
105	6 9/16	.547					1.537	1.873	2.547	3.220	3.893	4.567	5.240	5.913
106	6 5/8	.552					1.557	1.898	2.581	3.264	3.947	4.630	5.313	5.996
107	6 11/16	.557					1.577	1.924	2.616	3.309	4.002	4.695	5.387	6.080
108	6 3/4	.563					1.598	1.949	2.652	3.354	4.057	4.758	5.461	6.164
109	6 13/16	.568					1.619	1.975	2.687	3.400	4.112	4.824	5.536	6.248
110	6 7/8	.573					1.640	2.001	2.723	3.445	4.167	4.889	5.611	6.333
111	6 15/16	.578					1.661	2.027	2.759	3.491	4.223	4.955	5.686	6.418
112	7	.583					1.682	2.053	2.795	3.536	4.278	5.020	5.762	6.504
113	7 1/16	.589					1.703	2.079	2.830	3.582	4.334	5.086	5.837	6.589
114	7 1/8	.594					1.725	2.106	2.867	3.628	4.391	5.152	5.914	6.676
115	7 3/16	.599					1.746	2.132	2.904	3.675	4.447	5.219	5.991	6.763
116	7 1/4	.604					1.767	2.158	2.940	3.722	4.504	5.286	6.067	6.849
117	7 5/16	.609					1.788	2.184	2.976	3.768	4.560	5.352	6.144	6.936
118	7 3/8	.615					1.809	2.210	3.012	3.815	4.617	5.419	6.221	7.023
119	7 7/16	.620					1.830	2.236	3.049	3.861	4.674	5.486	6.298	7.111
120	7 1/2	.625					1.851	2.263	3.085	3.908	4.731	5.554	6.376	7.199
121	7 9/16	.630						2.290	3.123	3.956	4.789	5.622	6.455	7.288
122	7 5/8	.635						2.316	3.160	4.003	4.846	5.690	6.533	7.376
123	7 11/16	.641						2.343	3.196	4.050	4.904	5.758	6.611	7.465
124	7 3/4	.646						2.370	3.234	4.098	4.963	5.827	6.691	7.555
125	7 13/16	.651						2.397	3.271	4.146	5.021	5.895	6.770	7.645
126	7 7/8	.656						2.423	3.308	4.193	5.079	5.964	6.849	7.734
127	7 15/16	.661						2.451	3.346	4.242	5.138	6.034	6.929	7.825
128	8	.667						2.477	3.384	4.290	5.196	6.103	7.009	7.915
129	8 1/16	.672						2.505	3.422	4.339	5.256	6.173	7.090	8.007
130	8 1/8	.677						2.532	3.459	4.387	5.315	6.242	7.170	8.098
131	8 3/16	.682						2.559	3.498	4.436	5.374	6.313	7.251	8.189
132	8 1/4	.688						2.586	3.535	4.484	5.433	6.383	7.332	8.281
133	8 5/16	.693						2.614	3.574	4.534	5.494	6.454	7.414	8.374
134	8 3/8	.698						2.642	3.613	4.583	5.554	6.525	7.496	8.467
135	8 7/16	.703						2.669	3.650	4.632	5.614	6.596	7.577	8.559
136	8 1/2	.708						2.697	3.689	4.682	5.674	6.667	7.660	8.652
137	8 9/16	.714						2.725	3.728	4.732	6.735	6.739	7.742	8.746
138	8 5/8	.719						2.752	3.766	4.781	5.795	6.810	7.824	8.839
139	8 11/16	.724						2.780	3.805	4.831	5.856	6.882	7.908	8.933
140	8 3/4	.729						2.808	3.844	4.881	5.918	6.955	7.991	9.028
141	8 13/16	.734						2.836	3.884	4.932	5.979	7.027	8.075	9.123
142	8 7/8	.740						2.863	3.922	4.981	6.040	7.099	8.158	9.217
143	8 15/16	.745						2.891	3.961	5.032	6.102	7.172	8.242	9.312
144	9	.750						2.919	4.001	5.082	6.164	7.245	8.327	9.408

weirs with end contractions—Continued.

Length of weir—Continued.											Addition for increase of length.		
5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	1 in.	1 ft.	
5.680	6.839	7.998	9.157	10.316	11.475	13.793	16.111	18.429	20.747	23.065	0.0966	1.159	95
5.769	6.947	8.124	9.301	10.478	11.656	14.010	16.365	18.720	21.074	23.429	.0981	1.177	96
5.858	7.054	8.250	9.446	10.641	11.837	14.229	16.620	19.012	21.404	23.795	.0997	1.196	97
5.948	7.162	8.376	9.591	10.805	12.020	14.448	16.877	19.306	21.735	24.164	.101	1.214	98
6.038	7.271	8.504	9.737	10.970	12.203	14.669	17.135	19.601	22.067	24.533	.103	1.233	99
6.128	7.380	8.631	9.883	11.135	12.386	14.890	17.393	19.897	22.400	24.903	.104	1.252	100
6.219	7.490	8.760	10.031	11.301	12.572	15.113	17.654	20.195	22.736	25.277	.106	1.271	101
6.311	7.600	8.889	10.179	11.468	12.758	15.336	17.915	20.494	23.073	25.652	.107	1.289	102
6.402	7.710	9.018	10.327	11.635	12.944	15.560	18.177	20.794	23.411	26.028	.109	1.308	103
6.494	7.822	9.149	10.477	11.804	13.132	15.787	18.442	21.097	23.752	26.407	.111	1.328	104
6.587	7.934	9.280	10.627	11.974	13.320	16.014	18.707	21.401	24.094	26.787	.112	1.347	105
6.679	8.045	9.411	10.777	12.143	13.509	16.241	18.973	21.705	24.437	27.169	.114	1.366	106
6.773	8.158	9.543	10.929	12.314	13.700	16.470	19.241	22.012	24.783	27.554	.115	1.385	107
6.866	8.271	9.676	11.081	12.485	13.890	16.700	19.509	22.319	25.129	27.938	.117	1.405	108
6.961	8.385	9.809	11.234	12.658	14.083	16.931	19.780	22.629	25.478	28.327	.119	1.424	109
7.055	8.500	9.944	11.388	12.832	14.276	17.164	20.052	22.941	25.829	28.717	.120	1.444	110
7.150	8.614	10.078	11.542	13.005	14.469	17.397	20.324	23.252	26.180	29.107	.122	1.464	111
7.245	8.729	10.213	11.696	13.180	14.663	17.631	20.598	23.565	26.532	29.499	.124	1.484	112
7.341	8.845	10.348	11.852	13.355	14.859	17.866	20.873	23.880	26.887	29.894	.125	1.504	113
7.438	8.962	10.485	12.009	13.532	15.056	18.103	21.150	24.197	27.244	30.291	.127	1.524	114
7.534	9.078	10.622	12.165	13.709	15.252	18.340	21.427	24.514	27.601	30.688	.129	1.544	115
7.631	9.195	10.759	12.323	13.886	15.450	18.578	21.705	24.833	27.961	31.088	.130	1.564	116
7.728	9.313	10.897	12.481	14.065	15.649	18.817	21.985	25.154	28.322	31.490	.132	1.584	117
7.826	9.430	11.034	12.639	14.243	15.848	19.056	22.265	25.474	28.683	31.892	.134	1.604	118
7.923	9.548	11.173	12.798	14.422	16.047	19.297	22.546	25.796	29.046	32.295	.135	1.625	119
8.022	9.667	11.312	12.958	14.603	16.249	19.539	22.830	26.121	29.412	32.703	.137	1.645	120
8.121	9.787	11.453	13.119	14.785	16.451	19.783	23.115	26.447	29.779	33.111	.139	1.666	121
8.220	9.907	11.593	13.280	14.967	16.653	20.027	23.400	26.774	30.147	33.520	.141	1.687	122
8.319	10.027	11.734	13.442	15.149	16.857	20.272	23.687	27.102	30.517	33.932	.142	1.708	123
8.419	10.148	11.876	13.604	15.332	17.061	20.517	23.974	27.431	30.887	34.344	.144	1.728	124
8.519	10.269	12.018	13.767	15.516	17.266	20.764	24.263	27.762	31.260	34.759	.146	1.749	125
8.619	10.390	12.160	13.930	15.700	17.471	21.011	24.552	28.093	31.633	35.174	.148	1.770	126
8.721	10.512	12.303	14.095	15.886	17.678	21.260	24.843	28.426	32.009	35.592	.149	1.791	127
8.821	10.634	12.447	14.259	16.072	17.884	21.510	25.135	28.760	32.385	36.010	.151	1.813	128
8.924	10.758	12.591	14.425	16.259	18.093	21.761	25.429	29.097	32.764	36.432	.153	1.834	129
9.025	10.881	12.736	14.591	16.446	18.312	22.012	25.723	29.434	33.144	36.855	.155	1.855	130
9.128	11.005	12.881	14.758	16.635	18.511	22.265	26.018	29.772	33.525	37.278	.156	1.877	131
9.230	11.128	13.026	14.924	16.823	18.721	22.517	26.314	30.110	33.906	37.703	.158	1.898	132
9.334	11.254	13.173	15.093	17.013	18.933	22.773	26.613	30.453	34.292	38.132	.160	1.920	133
9.437	11.379	13.321	15.262	17.204	19.145	23.029	26.912	30.795	34.678	38.561	.162	1.942	134
9.541	11.504	13.467	15.431	17.394	19.358	23.284	27.211	31.138	35.065	38.992	.164	1.963	135
9.645	11.630	13.615	15.600	17.586	19.571	23.541	27.512	31.482	35.452	39.423	.165	1.985	136
9.749	11.757	13.764	15.771	17.778	19.785	23.799	27.813	31.828	35.842	39.856	.167	2.007	137
9.853	11.883	13.912	15.941	17.970	19.999	24.057	28.115	32.174	36.232	40.290	.169	2.029	138
9.959	12.010	14.061	16.112	18.164	20.215	24.317	28.420	32.522	36.624	40.727	.171	2.051	139
10.065	12.138	14.211	16.285	18.358	20.432	24.578	28.725	32.872	37.019	41.166	.173	2.073	140
10.171	12.267	14.362	16.578	18.554	20.649	24.841	29.032	33.224	37.415	41.606	.175	2.096	141
10.276	12.394	14.512	16.630	18.748	20.866	25.102	29.338	33.574	37.810	42.046	.177	2.118	142
10.383	12.523	14.663	16.804	18.944	21.085	25.365	29.646	33.927	38.208	42.489	.178	2.140	143
10.490	12.653	14.815	16.978	19.141	21.304	25.630	29.956	34.282	38.607	42.933	.180	2.163	144

Discharges in second-feet, rectangular

	Head.		Length of weir.											
	Inches.	Feet.	4 in.	6 in.	9 in.	12 in.	15 in.	18 in.	24 in.	2 ft. 6 in.	3 ft.	3 ft. 6 in.	4 ft.	4 ft. 6 in.
145	$9\frac{1}{16}$	0.755	.....	.....	.....	.....	.....	.....	4.040	5.133	6.226	7.319	8.411	9.504
146	$9\frac{1}{8}$	.760	.....	.....	.....	.....	.....	.....	4.080	5.184	6.288	7.392	8.496	9.600
147	$9\frac{3}{16}$	.765	.....	.....	.....	.....	.....	.....	4.120	5.235	6.351	7.466	8.581	9.697
148	$9\frac{1}{4}$	.771	.....	.....	.....	.....	.....	.....	4.160	5.286	6.413	7.540	8.667	9.794
149	$9\frac{5}{16}$	.776	.....	.....	.....	.....	.....	.....	4.199	5.338	6.476	7.614	8.753	9.891
150	$9\frac{3}{8}$	.781	.....	.....	.....	.....	.....	.....	4.239	5.389	6.539	7.689	8.839	9.988
151	$9\frac{7}{16}$	.786	.....	.....	.....	.....	.....	.....	4.280	5.441	6.602	7.763	8.925	10.086
152	$9\frac{1}{2}$	.792	.....	.....	.....	.....	.....	.....	4.320	5.492	6.665	7.838	9.011	10.184
153	$9\frac{9}{16}$	.797	.....	.....	.....	.....	.....	.....	4.360	5.544	6.729	7.913	9.097	10.282
154	$9\frac{5}{8}$	.802	.....	.....	.....	.....	.....	.....	4.400	5.596	6.792	7.988	9.184	10.380
155	$9\frac{11}{16}$	.807	.....	.....	.....	.....	.....	.....	4.440	5.648	6.856	8.064	9.271	10.479
156	$9\frac{3}{4}$	.812	.....	.....	.....	.....	.....	.....	4.482	5.701	6.921	8.140	9.359	10.579
157	$9\frac{13}{16}$	.818	.....	.....	.....	.....	.....	.....	4.522	5.754	6.985	8.216	9.447	10.678
158	$9\frac{7}{8}$	.823	.....	.....	.....	.....	.....	.....	4.563	5.806	7.049	8.292	9.534	10.777
159	$9\frac{15}{16}$	.828	.....	.....	.....	.....	.....	.....	4.604	5.858	7.113	8.368	9.623	10.877
160	10	.833	.....	.....	.....	.....	.....	.....	4.644	5.911	7.177	8.444	9.711	10.977

weirs with end contractions—Continued.

Length of weir—Continued.											Addition for increase of length.		
5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	1 in.	1 ft.	
10.597	12.782	14.967	17.153	19.338	21.534	25.894	30.265	34.636	39.007	43.378	0.182	2.185	145
10.704	12.913	15.121	17.329	19.537	21.745	26.161	30.577	34.994	39.410	43.826	.184	2.208	146
10.812	13.043	15.274	17.505	19.735	21.966	26.428	30.889	35.351	39.813	44.274	.186	2.231	147
10.920	13.174	15.428	17.681	19.935	22.188	26.696	31.203	35.710	40.217	44.724	.188	2.254	148
11.029	13.306	15.582	17.859	20.135	22.412	26.965	31.518	36.071	40.624	45.177	.190	2.277	149
11.138	13.438	15.737	18.037	20.336	22.636	27.235	31.834	36.433	41.032	45.631	.192	2.300	150
11.247	13.570	15.892	18.215	20.537	22.860	27.505	32.150	36.795	41.440	46.085	.194	2.323	151
11.356	13.702	16.048	18.393	20.739	23.084	27.776	32.467	37.158	41.849	46.540	.196	2.346	152
11.466	13.835	16.204	18.573	20.941	23.310	28.048	32.785	37.523	42.261	46.998	.197	2.369	153
11.576	13.969	16.361	18.753	21.145	23.537	28.321	33.105	37.890	42.674	47.458	.199	2.392	154
11.687	14.102	16.517	18.933	21.348	23.764	28.594	33.425	38.256	43.087	47.918	.201	2.415	155
11.798	14.237	16.676	19.145	21.553	23.992	28.870	33.747	38.625	43.503	48.380	.203	2.439	156
11.909	14.372	16.834	19.296	21.758	24.221	29.145	34.070	38.995	43.919	48.844	.205	2.462	157
12.020	14.506	16.992	19.478	21.963	24.449	29.421	34.392	39.364	44.336	49.307	.207	2.486	158
12.132	14.642	17.151	19.661	22.170	24.680	29.699	34.718	39.737	44.756	49.775	.209	2.510	159
12.244	14.777	17.310	19.843	22.377	24.910	29.976	35.043	40.109	45.175	50.242	.211	2.533	160

RAINFALL TABLES.

The following records of precipitation are arranged alphabetically by counties:

Record of precipitation at Tamarack, Alpine County.

[Latitude, 38° 37′; longitude, 119° 58′; elevation, 8,030 feet. Authority, P. C. Huntington.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1898–1899	------	------	------	------	------	------	12.80	2.50	1.75	0.00	0.00	0.00	[a]17.05
1899–1900	0.00	6.10	4.25	8.10	3.00	2.85	6.65	4.60	0.65	0.00	0.00	0.00	36.20
1900–1901	0.00	3.30	8.50	2.05	13.65	15.90	4.30	6.40	.95	0.39	T.	3.17	58.71
1901–1902	1.60	2.69	3.22	2.38	3.37	13.00	11.35	4.60	1.68	0.00	0.00	0.00	43.89
3-year mean	------	------	------	------	------	------	------	------	------	------	------	------	46.27

[a] Year incomplete.

Record of precipitation at Jackson, Amador County.

[Latitude, 38° 21′; longitude, 120° 45′; elevation, 1,975 feet. Authority, Richard Webb.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Total.
1877–78	0	0.70	2.00	1.45	8.45	13.04	5.55	1.97	0.24	0.04	0	0	33.44
1878–79	0.05	.97	.86	.70	5.56	5.26	6.97	4.97	2.19	.25	0	0	27.78
1879–80	0	2.92	4.33	5.38	2.30	3.44	3.51	13.59	2.41	0	0	0	37.88
1880–81	0	.15	.60	10.47	8.86	4.77	2.11	2.96	0	.05	0	0	29.97
1881–82	.58	1.38	1.82	5.32	3.86	3.89	7.71	3.72	.49	.10	0	0	28.87
1882–83	.75	5.62	3.34	1.44	3.61	1.95	3.85	2.25	4.63	0	0	0	27.44
1883–84	.90	1.43	1.48	1.59	4.02	8.58	9.41	7.65	.99	1.85	0	0	37.90
1884–85	.26	1.70	.10	14.64	1.89	.27	.26	1.34	.15	.59	0	0	21.20
1885–86	.23	0	12.80	2.78	7.97	.75	4.54	8.04	0	0	.01	0	37.12
1891–92	------	------	1.08	8.03	3.21	3.03	4.89	2.70	3.85	.46	0	------	[a]27.25
1892–93	.40	------	7.48	5.52	------	------	------	------	------	0	.04	0	[a]13.44
1893–94	1.34	.50	5.28	3.35	9.88	10.84	2.52	1.38	4.15	1.48	T.	T.	40.72
1894–95	1.10	3.68	1.10	15.50	12.04	6.22	3.86	3.92	2.68	0	.07	T.	50.17
1895–96	1.14	.28	.93	3.67	8.79	.43	5.18	10.89	2.11	0	.04	0.18	33.64
1896–97	.23	1.35	8.78	4.61	4.77	5.04	7.66	1.46	.03	1.10	0	.12	35.15
1897–98	.19	3.05	2.25	3.18	1.47	4.91	1.18	1.11	1.64	.43	0	0	19.41
1898–99	.40	1.04	2.11	2.70	5.20	.57	14.60	1.49	1.07	1.00	0	.07	30.25
1899–1900	0	5.86	5.81	7.45	2.37	2.15	4.37	3.52	1.83	.06	0	0	33.42
1900–1901	.41	2.74	8.32	2.24	7.13	11.24	2:58	3.83	1.18	.08	T.	T.	39.74
1901–2	3.39	2.62	3.64	3.22	1.25	9.36	4.37	2.71	1.99	.15	0	T.	32.70
18-year mean	------	------	------	------	3.82	------	------	------	------	------	------	------	33.16

[a] Year incomplete.

Record of precipitation at Cherokee, Butte County.

[Latitude, 39° 38′; longitude, 121° 34′; elevation, 1,200 feet. Authority, L. Glass.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1871–72	0	2.95	5.41	10.09	10.58	12.25	2.33	3.11	0.45	0.56	0	0	47.73
1872–73	0	0	3.89	8.46	3.21	9.18	.59	2.14	.88	0	0	0	28.35
1873–74	0	.94	5.02	16.48	9.79	6.74	7.36	3.57	1.58	.11	0	0	51.59
1874–75	0	4.65	14.28	.43	10.84	.38	1.90	1.16	.66	1.04	0	0	35.34
1875–76	0	.24	10.41	6.96	8.48	11.95	13.36	2.66	.23	0	1.19	0	55.48
1876–77	.25	10.19	.....	.....	7.70	3.10	3.84	.75	1.51	1.28	.....	.....	[a]28.62
1877–78	0	1.72	4.32	3.60	19.63	20.00	8.87	3.53	1.14	.60	.10	.45	63.96
1878–79	1.52	2.09	2.39	.69	8.26	9.09	18.23	5.66	3.66	.35	0	.28	52.22
1879–80	2.60	4.20	12.64	3.88	3.16	2.20	18.07	2.79	0	0	0	0	49.54
1880–81	0	0	.42	16.84	14.95	7.31	2.34	1.49	1.16	0	0	0	44.51
1881–82	.90	2.92	.39	6.79	4.04	8.32	6.47	4.59	0	0	0	0	34.42
1882–83	1.31	3.23	4.65	3.72	1.42	1.31	8.10	3.12	6.98	0	0	0	33.84
1883–84	0	5.21	1.06	1.17	6.69	6.16	11.89	9.27	.80	3.87	0	0	46.12
12-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45.26

[a] Year incomplete.

Record of precipitation at Cherokee Reservoir, Butte County.

[Latitude, 39° 38′; longitude, 121° 33′; elevation, 1,200 feet. Authority, L. Glass.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1873–74	0	0	5.80	18.25	13.07	8.15	10.78	4.83	1.03	0	0	0	61.91
1874–75	0	5.99	16.99	1.15	12.47	.61	3.76	.10	1.10	2.00	0	0	44.17
1875–76	0	1.00	15.20	11.26	11.03	13.08	15.94	3.48	1.00	0	1.00	.73	73.72
1876–77	1.28	12.90	0	0	11.10	3.62	6.62	1.62	2.53	1.87	.80	0	42.34
1877–78	0	2.22	5.70	3.98	23.54	24.00	12.01	4.98	1.67	0	0	.68	78.78
1878–79	1.98	2.40	3.12	0	8.89	10.28	21.06	7.68	5.06	.50	0	0	60.97
6-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60.32

Record of precipitation at Fouts Springs, Colusa County.

[Latitude, 39° 20′; longitude, 122° 40′; elevation 1,650 feet. Authority, John F. Fouts and S. E. Stites.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1885–86	(0.00)	0.20	19.43	4.85	9.29	2.00	1.65	5.01	0.50	T.	0	0	42.93
1886–87	0	.70	.20	2.83	2.00	7.88	2.12	1.66	T.	T.	T.	0	17.39
1887–88	T.	0	1.25	4.35	10.83	.70	5.00	(3.33)	2.14	0.65	(0.00)	(0.00)	28.25
1892–93	.....	.....	.....	.....	2.08	7.11	5.17	1.95	.....	.....	.....	.....	[a]16.31
1900–1901	.....	.....	.....	5.41	12.57	4.06	.....	.79	.....	.....	.....	.....	[a]22.83
3-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29.52

[a] Year incomplete.

Record of precipitation at Little Stony, Colusa County.

[Latitude, 39° 25′; longitude, 122° 30′; elevation, ——feet. Authority, C. M. Polley.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1884–85	------	------	------	8.40	1.29	1.04	0	1.38	0	1.19	0	0	[a]13.30
1885–86	0	0.27	13.29	3.51	3.44	0	1.10	3.89	------	------	------	------	[a]25.50

[a] Year incomplete.

Record of precipitation at Mount Diablo, Contra Costa County.

[Latitude, 37° 53′; longitude, 121° 54′; elevation, 3,848 feet. Authority, Pacific Railway system. J. S. Hall.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1874–75	------	------	------	------	------	0	0.63	T.	0.33	0.62	0	0	[a]1.58
1875–76	0.00	0.18	9.19	3.11	5.60	4.95	6.23	0.65	(.39)	(.33)	.03	0	30.66
1876–77	T.	2.95	.27	0	4.63	1.89	1.11	.02	.45	.03	0	0	11.35
2-year mean	------	------	------	------	------	------	------	------	------	------	------	------	21.01

[a] Year incomplete.

Record of precipitation at Eldorado, Eldorado County.

[Latitude, 38° 41′; longitude, 120° 51′; elevation, 1,609 feet. Authority, Pacific Railway system.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1888–89	------	------	------	4.00	0.31	0.38	8.41	1.60	7.50	0.12	0	0	[a]22.32
1889–90	0	7.46	6.32	14.94	12.48	5.67	10.04	3.00	3.45	0	0	.01	63.37
1890–91	1.77	.10	0	5.48	1.07	6.93	6.71	3.52	.93	.95	0	0	27.46
1891–92	.09	.85	1.08	9.09	3.48	5.75	7.24	3.61	4.91	.15	0	0	36.25
1892–93	.08	2.04	7.80	10.33	5.40	2.56	8.02	3.13	1.51	0	0	0	40.87
1893–94	1.14	.65	4.58	4.26	8.74	11.90	2.25	1.63	3.93	1.00	0	0	40.13
1894–95	.67	3.52	1.05	14.37	14.25	4.18	3.94	4.06	2.34	0	0	0	48.38
1895–96	1.41	0	.78	3.79	13.82	.15	7.80	9.56	2.59	0	0	.03	39.93
1896–97	.41	1.00	9.49	3.62	3.51	4.50	7.63	1.65	.23	.55	0	0	32.59
1897–98	.17	2.54	2.21	2.88	1.43	2.19	.86	.53	2.67	.60	0	0	16.08
1898–99	.37	.95	2.45	2.70	4.60	.57	13.10	1.02	1.80	1.57	0	.06	29.19
1899–1900	0	7.18	6.19	6.73	3.87	1.99	5.15	3.40	1.70	0	0	0	36.21
1900–1901	.10	3.26	8.11	2.23	6.90	8.73	1.69	5.54	.89	0	0	0	37.45
1901–2	2.41	1.89	2.91	3.40	1.11	10.75	4.31	2.46	.82	.62	0	0	30.68
13-year mean	------	------	------	------	------	------	------	------	------	------	------	------	36.81

[a] Year incomplete.

Record of precipitation at Georgetown, Eldorado County.

[Latitude, 38° 54′; longitude, 120° 50′; elevation, 2,500 feet. Authority, C. M. Fitzgerald.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1872–73	0	0	4.30	18.72	4.08	13.05	3.05	3.11	0.12	0	0.03	0	46.46
1873–74	0	0.61	.55	16.60	16.66	8.03	13.87	5.80	1.32	.20	0	0	63.64
1874–75	0	3.86	14.60	1.24	17.87	.04	5.07	.31	2.03	2.06	0	0	47.08
1875–76	0	1.90	24.12	10.85	13.09	9.97	14.54	4.78	1.22	0	.77	0	81.24
1876–77	0	11.47	.80	0	12.44	2.14	7.78	1.74	3.87	.24	0	0	40.48
1877–78	0	1.03	4.30	1.97	16.21	22.78	10.92	2.99	.99	.12	0	0	61.31
1878–79	.66	2.56	2.66	.48	11.24	12.41	17.57	9.65	3.39	.34	0	0	60.96
1879–80	0	3.85	6.25	11.73	5.47	6.00	5.50	25.63	5.97	0	0	0	70.40
1880–81	0	.18	.37	22.67	20.83	12.85	3.84	2.40	.40	2.28	0	0	65.82
1881–82	2.03	4.23	3.30	10.32	8.59	5.88	10.44	7.11	2.06	.18	0	0	54.14
1882–83	.16	7.75	7.00	3.31	4.70	3.08	8.73	3.87	7.34	0	0	0	45.94
1883–84	1.60	4.10	1.94	3.50	7.53	13.80	19.94	15.07	1.52	3.65	0	.01	72.66
1884–85	.80	3.54	.03	33.73	4.37	.82	.24	3.98	.19	2.28	.03	0	50.01
1885–86	1.16	0	20.77	7.03	18.32	1.16	7.75	15.04	1.76	.06	0	0	73.05
1886–87	0	3.43	1.79	6.90	3.36	15.79	2.40	6.54	.93	.18	0	0	41.32
1887–88	.53	0	1.44	7.66	14.21	3.14	6.02	1.18	.38	1.56	.04	0	36.16
1888–89	.41	0	4.67	7.99	.66	.68	12.29	2.77	7.07	.25	0	0	36.79
1889–90	0	10.45	1.23	22.94	19.90	8.96	14.70	3.86	4.66	.10	0	0	86.80
1890–91	2.81	.19	T.	7.65	.06	10.39	10.00	3.79	2.71	2.22	.42	0	40.24
1891–92	.17	1.80	1.59	3.74	5.48	8.44	7.90	7.47	7.58	.38	T	0	44 55
1892–93	.57	3.11	13.31	15.76	8.44	8.20	17.69	6.34	1.51	0	T.	T.	74 93
1893–94	2.06	1.60	10.94	7.19	13.89	16.25	4.74	2.40	5.25	1.61	T.	.20	66.13
1894–95	1.26	6.22	1.53	20.93	20.52	7.69	4.67	4.77	4.30	0	.03	.07	71.99
1895–96	2.64	.20	2.18	7.27	19.55	.77	11.28	16.51	4.81	0	.20	.10	65.51
1896–97	.83	1.76	17.18	6.37	4.83	18.26	13.65	2.40	.20	1.00	0	.04	66.52
1897–98	.30	4.25	4.09	5.57	2.13	8.83	1.80	.92	2.78	1.23	0	T.	31.90
1898–99	.53	2.22	4.34	3.35	8.59	.61	21.39	1.60	2.32	1.61	0	.14	46.70
1899–1900	0	9.87	10.33	11.91	5.07	4.29	6.65	5.46	1.88	.13	.08	0	55.67
1900–1901	1.00	5.49	8.99	4.16	10.40	13.70	2.78	6.48	.99	0	T.	T.	53.99
1901–2	4.50	3.32	4.72	5.51	1.92	16 95	6.47	3.69	1.44	.56	0	.05	49.13
30-year mean													56.72

Record of precipitation at Placerville, Eldorado County.

[Latitude, 38° 44′; longitude, 122° 48′; elevation, 2,109 feet. Authority, G. M. Barlow and Pacific Railway system.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1873–74	0	0	0	0	12.58	4.72	10.77	3.92	1.96	0	0	0	33.95
1874–75	0	3.42	9.59	1.18	12.58	.08	2.88	.61	1.58	1.84	0	0	33.76
1875–76	0	1.20	17.64	6.75	10.79	8.01	11.86	3.60	1.40	0	0.49	0.07	61.81
1876–77	0.02	6.16	.78	0	10.54	1.17	0	4.00	0	0	0	0	22.67
1877–78	.66	.99	2.25	1.55	10.45	11.73	6.53	1.80	1.67	.05	.02	.02	37.72
1878–79	.52	1.50	2.04	.41	7.75	8.00	9.38	6.25	2.48	.33	.02	.02	38.70
1879–80	0	3.47	5.28	7.53	5.04	6.58	5.96	17.92	4.43	0	0	0	56.21
1880–81	0	.35	.58	16.94	15.53	7.01	3.38	2.36	0	1.89	0	0	48.04
1881–82	1.08	2.80	2.87	7.70	6.71	5.15	9.30	5.53	1.19	.13	0	0	42.46
1882–83	.93	5.72	4.94	1.98	3.74	2.58	6.88	3.54	6.25	0	0	0	36.56
1883–84	1.67	3.38	1.67	2.63	6.06	11.56	14.46	11.82	1.60	2.51	0	.03	57.39
1884–85	.85	2.47	.10	22.65	4.15	.97	.33	3.32	.27	1.42	0	0	36.53
1885–86	.55	0	15.97	5.22	13.03	1.15	5.22	11.75	1.24	.50	T.	0	54.63
1886–87	0	1.42	.91	5.02	3.18	14.18	2.09	5.71	.53	.28	0	0	33.32
1887–88	.58	.06	1.42	8.34	11.27	2.39	5.26	.91	1.10	1.50	.04	T.	32.87
1888–89	.88	T.	5.98	7.06	1.03	.86	9.78	1.93	8.05	.16	0	T.	35.73
1889–90	0	9.07	7.77	18.18	14.57	7.46	13.81	3.36	4.01	0	0	T.	78.23
1890–91	1.64	T.	T.	6.89	1.40	9.13	7.82	3.62	1.23	.85	.05	0	24.10
1891–92	.45	.50	1.48	12.57	4.43	6.83	8.26	4.33	5.35	0	0	0	44.20
1892–93	.20	2.23	12.14	15.48	7.94	7.52	12.29	4.83	1.34	0	T.	0	63.97
1893–94	1.40	.95	6.19	5.20	11.55	14.40	3.31	2.35	4.55	1.39	T.	0	51.29
1894–95	1.35	4.25	1.20	19.03	17.85	5.07	4.43	4.75	2.58	0	T	T.	60.51
1895–96	1.79	.16	.77	5.24	16.38	.78	11.11	12.00	3.56	0	.03	.15	51.97
1896–97	.63	1.51	11.71	4.47	4.68	14.61	9.49	2.23	.36	1.09	0	.05	50.83
1897–98	.13	3.39	2.68	2.43	1.78	6.18	1.28	.58	2.70	.66	T.	0	21.81
1898–99	.11	1.00	2.30	2.80	5.62	.48	14.98	2.01	1.78	.88	0	.10	32.06
1899–1900	0	7.73	6.72	8.32	3.92	2.89	5.84	4.32	1.15	.68	T.	0	41.57
1900–1901	.55	3.62	9.82	3.30	9.95	9.53	2.34	6.54	1.05	0	0	0	46.70
1901–2	3.13	2.12	3.74	3.58	1.35	10.15	5.33	2.73	1.35	.60	0	.14	34.22
29-year mean													43.58

Record of precipitation at Shingle Springs, Eldorado County.

[Latitude, 38° 39′; longitude, 120° 55′; elevation, 1,427 feet. Authority, M. Phelps and Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1849–50	0	0.08	5.65	10.04	13.07	2.15	6.80	0.45	0.02	0	0	0	38.26
1850–51	1.23	.10	.65	2.70	4.80	.40	2.10	4.80	.40	0	0	0	17.18
1851–52	.40	.30	2.45	7.80	3.20	.50	9.60	7.25	1.00	0	0	0	32.50
1852–53	0	.50	7.20	11.40	13.70	2.40	8.20	3.00	1.10	0.05	0	0	47.55
1853–54	1.20	.75	6.40	4.10	4.40	3.40	4.30	5.40	.20	.30	0	0	30.45
1854–55	0	3.72	2.70	3.50	3.20	1.10	2.50	2.10	.68	0	0	0	19.50
1855–56	.70	0	2.40	5.70	4.10	.80	3.40	1.20	.20	.10	0	0	18.60
1856–57	0	0	2.15	6.35	6.50	7.05	1.94	0	.42	.35	0.35	0	25.11
1857–58	0	.42	4.04	1.99	2.37	2.69	4.00	1.70	.20	.60	0	0	18.01
1858–59	0	3.25	.50	6.20	1.22	12.00	5.81	1.82	1.51	0	0	0	32.31
1859–60	0	.15	11.16	2.40	2.20	1.15	4.71	3.40	2.10	.02	.80	0	28.09
1860–61	0	1.20	.50	7.43	3.78	4.60	8.34	.20	.15	.05	0	0	26.25
1861–62	0	0	6.90	11.22	34.13	6.75	6.90	7.34	4.10	1.90	2.56	0	81.80
1862–63	0	.78	.37	2.84	1.45	4.96	4.01	2.76	2.10	0	0	0	19.27
1863–64	0	0	2.05	6.30	7.29	3.21	.63	3.94	.85	0	0	0	24.27
1864–65	0	.08	9.94	9.13	5.13	5.63	1.13	2.50	.89	0	0	0	34.43
1865–66	0	.45	6.84	2.57	11.08	3.46	6.21	1.31	4.88	.18	0	0	36.98
1866–67	0	0	4.73	18.77	9.17	7.51	4.09	6.01	.01	0	0	0	50.29
1867–68	.82	2.24	7.17	23.76	12.12	3.70	14.39	------	------	------	------	------	[a]64.20
1885–86	------	------	------	4.99	10.77	.69	3.84	9.51	.71	------	------	------	[a]30.51
1886–87	------	1.66	.93	3.50	1.67	12.21	1.45	------	.06	0	------	------	[a]21.48
1887–88	.49	T.	1.08	6.18	8.82	1.08	4.22	.43	.18	.31	0	0	22.79
1888–89	0	0	4.45	4.45	.40	.70	9.01	1.98	7.80	0	0	0	28.79
1889–90	0	8.73	7.85	17.35	13.50	6.70	10.48	2.75	3.65	0	0	0	71.01
1890–91	1.50	.08	0	5.40	1.40	7.65	7.97	3.80	1.60	.70	0	0	30.10
1891–92	.04	.70	1.10	7.58	2.55	6.43	4.95	2.26	1.98	0	0	0	27.59
1892–93	.15	2.30	7.85	8.25	4.97	4.17	9.78	2.95	.95	0	0	0	41.37
1893–94	.85	.40	4.98	3.30	7.07	9.40	1.60	1.03	3.25	.25	0	0	32.13
1894–95	0	3.55	.99	14.50	11.33	4.48	1.98	3.20	1.70	0	0	0	41.73
1895–96	1.40	.15	2.53	3.56	14.07	.30	6.33	8.21	1.79	0	0	0	38.34
1896–97	.25	1.05	11.75	7.18	4.25	12.75	7.00	.97	.22	.30	0	0	45.72
1897–98	0	2.15	1.40	3.25	.93	3.80	.05	.40	2.10	.52	0	0	14.60
1898–99	.25	.80	1.90	3.05	4.87	.37	14.13	.60	1.28	1.25	0	.15	28.65
1899–1900	0	6.25	6.29	7.30	------	------	------	------	------	------	------	------	[a]19.84
30-year mean	------	------	------	------	------	------	------	------	------	------	------	------	33.46

[a] Year incomplete.

Record of precipitation at Jacinto, Glenn County.

[Latitude, 39° 35′; longitude, 122° 00′; elevation, 110 feet.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1892–93	0.62	1.21	6.32	8.13	4.20	2.99	3.71	0.87	1.44	0	0	0	29.49
1893–94	.47	.06	2.67	1.61	4.50	1.47	.89	.51	1.24	0	0	0	13.42
1894–95	1.20	1.33	.35	8.69	8.73	1.86	1.74	2.49	.22	0	0.36	0	26.97
1895–96	2.33	0	1.10	.94	9.37	.24	2.92	4.03	.69	0	0	0.52	22.14
1896–97	.63	.68	3.06	5.28	3.78	3.54	1.72	.77	.60	0.44	0	0	20.50
1897–98	0	2.12	1.16	1.40	.76	3.42	.31	2.07	0	0	0	0	11.24
1898–99	.35	.41	0.49	1.39	6.36	0	4.29	.36	1.21	.53	0	0	15.39
1899–1900	0	2.68	4.40	3.40	3.06	.17	1.27	1.68	.72	0	0	0	17.38
1900–1901	0	2.42	5.00	------	------	------	------	------	------	------	------	------	[a]7.42
8-year mean	------	------	------	------	------	------	------	------	------	------	------	------	19.57

[a] Year incomplete.

Record of precipitation at Julians, on Stony Creek, Glenn County.

[Latitude, 39° 35′; longitude, 122° 30′; elevation, 750 feet. Authority, Mrs. Lee Julian.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1900–1901	------	------	------	------	------	4.26	0.12	1.24	0.50	0	0	0	a6.12
1901–2	1.07	0.60	3.18	0.82	0.85	9.27	3.24	2.37	2.06	0	0	0	23.46

a Year incomplete.

Record of precipitation at Christmas Prairie, Humboldt County.

[Latitude, 40° 55′; longitude, 124° 00′; elevation, 3,000 feet. Authority, J. H. Blake.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1883–84	------	------	------	------	------	------	------	------	------	1.56	0.24	0.01	a1.81
1884–85	3.23	2.17	1.37	26.44	8.79	8.39	1.45	3.30	1.34	1.57	0	0	58.05
1885–86	.93	1.65	31.99	18.85	16.59	6.30	6.51	12.97	2.83	0	1.17	0	99.79
1886–87	0	4.72	3.93	13.73	15.97	20.92	5.00	------	------	------	------	------	a64.27
2-year mean	------	------	------	------	------	------	------	------	------	------	------	------	78.92

a Year incomplete.

Record precipitation at Bishop Creek, Inyo County.

[Latitude, 37° 21′; longitude, 118° 22′; elevation, 4,450 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1883–84	0.12	0.11	0	0.38	0.62	0.64	0.94	0.05	0	0	0	0	2.86
1884–85	0	0	0	1.00	0	0	.67	.14	0	0	0	0	1.81
1885–86	0	.02	0.35	0	1.03	0	.50	.38	0	0	0	0	2.28
1886–87	0	0	0	.20	.65	1.58	0	.35	0.55	0.35	0	0	3.68
1887–88	.15	.15	.05	1.10	1.37	.47	.05	0	0	.35	0.20	0	3.89
1888–89	0	0	1.72	.40	.10	.50	1.46	.12	.30	0	0	0	4.60
1889–90	0	.03	.35	1.20	4.75	.30	0	0	0	0	0	0.50	7.13
1890–91	.69	0	0	1.00	0	3.70	.28	0	2.90	0	0	.03	8.60
1891–92	.19	0	0	3.52	.10	.70	1.10	0	.25	T.	0	0	5.86
1892–93	0	.20	1.42	2.27	1.22	1.12	.15	0	0	0	1.05	T.	7.43
1893–94	.19	0	.10	.49	.30	.75	.09	.05	T.	.35	T.	.23	2.55
1894–95	T.	0	0	1.18	1.10	.50	.22	.29	.15	.11	.21	.07	3.83
1895–96	T.	.16	.15	T.	1.07	0	.60	.05	.03	0	.57	.06	2.69
1896–97	.05	T.	T.	.16	.32	1.67	1.75	0	.12	T.	.01	.05	4.13
1897–98	.09	.39	T.	.49	.05	.13	T.	.21	.27	T.	T.	.06	1.69
1898–99	.41	0	.21	.11	1.65	0	T.	.64	.02	0	0	.05	3.09
1899–1900	0	.14	.05	1.05	.49	.01	.54	.60	.34	.12	T.	0	3.34
1900–1901	.39	.03	2.69	.17	4.89	1.01	T.	.50	1.29	T.	0	.93	11.90
1901–2	0	.81	.61	.12	.07	.55	1.53	.61	.06	0	T.	.12	4.48
19-year mean	------	------	------	------	------	------	------	------	------	------	------	------	4.52

a Year incomplete.

Record of precipitation at Camp Independence, Inyo County.

[Latitude, 36° 50′; longitude, 118° 10′; elevation, 4,598 feet. Authority, United States War Department.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1865–66	-----	-----	0	0.65	2.42	0	0	0.16	-----	-----	-----	-----	[a]3.23
1866–67	0	0.32	0	2.27	0	1.63	4.76	.53	0.76	0	0.01	1.15	11.43
1867–68	0.07	.32	0.21	12.19	5.46	0	0	.40	.71	0	.10	0	19.46
1868–69	0	.74	.44	1.17	.16	0	.32	.11	.36	0	.03	0	3.33
1869–70	0	0	.14	0	.20	1.36	0	.21	.27	0	.35	.10	2.63
1870–71	0	1.10	0	1.00	0	1.28	0	0	0	.30	0	0	3.68
1871–72	0	0	.65	4.70	0	.30	.28	.55	.18	0	.28	.12	7.06
1872–73	0	0	0	1.18	0	.40	0	0	0	0	0	.05	1.63
1873–74	.10	0	0	3.40	2.40	1.00	0	0	0	.01	.15	0	7.06
1874–75	.40	.80	.40	0	1.73	0	0	0	0	0	0	0	3.33
1875–76	.01	0	.66	.62	1.51	.70	.87	0	0	.15	.19	.56	5.27
1876–77	.16	.26	0	0	.76	0	0	.59	.69	0	0	0	2.46
1891–92	-----	-----	-----	-----	-----	-----	.62	-----	.96	.07	T.	T.	[a]1.65
1892–93	0	.35	.23	1.61	1.51	2.91	.98	.02	T.	0	.77	T.	8.38
1893–94	T.	0	.10	.75	.12	.42	.09	.02	.10	.11	.12	.51	2.34
1894–95	T.	0	0	1.89	1.24	1.18	.12	T	.01	T.	T.	.04	4.48
1895–96	T.	.83	.67	.08	-----	-----	-----	-----	-----	-----	-----	-----	[a]1.58
1896–97	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1897–98	-----	-----	-----	-----	-----	-----	0	.16	.23	T.	T.	.11	[a].50
1898–99	.20	0	.10	.20	.54	T.	.01	.02	.03	.37	.01	.06	1.54
1899–1900	T.	.30	.85	.56	.31	.05	.67	.62	.22	.04	.08	T.	3.70
1900–1901	.75	.01	1.34	.13	2.81	.64	.05	T.	.36	0	.10	.32	6.51
1901–2	0	.65	.22	.06	.04	1.69	1.05	.17	.04	.01	.17	.13	4.23
18-year mean	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.47

[a] Year incomplete.

Record of precipitation at Keeler, Inyo County.

[Latitude, 36° 35′; longitude, 117° 50′; elevation, 3,622 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1883–84	-----	-----	-----	-----	-----	-----	-----	0.20	1.60	0.80	0	0.20	[a]2.80
1884–85	0	0	0	0.70	0	0	0.12	.82	0	.08	0	.11	1.83
1885–86	0	0.25	0.65	.36	0.49	0.14	.60	.40	0	0	.14	.08	3.11
1886–87	0	.01	.08	0	T.	.93	0	1.14	.04	T.	.52	0	2.72
1887–88	1.08	.84	.01	.48	.70	1.21	.30	.12	.30	.20	.17	.10	5.51
1888–89	.06	0	1.68	.82	.04	T.	.52	.12	.06	.01	0	T.	3.31
1889–90	.08	.56	.05	.56	.42	.01	T.	.10	.20	0	T.	1.71	3.69
1890–91	.93	.03	.12	.22	0	1.00	2.01	0	.37	.30	.06	.02	5.06
1891–92	.19	.04	0	.31	.26	.19	.32	0	.55	T.	0	0	1.87
1892–93	T.	.81	.11	.54	.71	.75	1.50	0	T.	0	1.41	T.	5.83
1893–94	T.	T.	.03	1.48	T.	.29	.01	T.	T.	T.	.11	0	1.92
1894–95	0	0	0	1.05	.35	1.15	T.	.25	T.	T.	T.	T.	2.80
1895–96	T.	0	0	T.	.45	0	T.	T.	.15	T.	.25	1.42	2.27
1896–97	.50	T.	0	.25	.10	.27	.13	0	T.	0	0	.19	1.44
1897–98	.14	.15	T.	T.	0	0	0	.05	0	0	0	0	.34
1898–99	T.	0	T.	.30	.40	.45	0	.01	T.	.50	T.	T.	1.66
1899–1900	0	T.	1.75	T.	T.	0	.16	1.25	.23	T.	.10	T.	3.49
1900–1901	.35	.09	.45	0	.75	.25	0	T.	.40	0	0	.90	3.19
1901–2	0	.50	0	0	T.	.25	1.25	0	0	0	T.	T.	2
18-year mean	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.89

[a] Year incomplete.

Record of precipitation at Bear Valley, Kern County.

[Latitude, 35° 10′; longitude, 118° 30′; elevation, 4,000 feet. Authority, Philip Fickert, Tehachapai.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1894–95	1.48	6.38	1.25	22.37	29.22	6.64	7.42	3.25	6.57	0	0.04	0.20	84.82
1895–96	5.18	1.25	2.08	9.45	25.39	1.66	14.47	18.32	10.03	0	.72	.68	89.23
1896–97	2.13	2.57	18.35	8.02	4.18	16.05	19.12	3.35	.80	------	------	------	a74.57
1897–98	------	------	------	5.96	3	10.44	------	1.65	3.93	2	0	T.	a26.98
1898–99	.73	3.07	6.26	3.44	11.95	3.20	23.34	2.51	4	1.01	0	.93	60.44
1899–1900	0	14.16	11.91	12.81	2.77	1.34	1	5.05	2.47	0	0	0	51.51
1900–1901	0	1.76	2.71	.32	1.91	5.30	2.75	1.77	1.43	0	T.	0	17.95
1901–2	0	1.27	.56	.90	3.20	5	5.36	3.48	.75	0	0	0	20.52
6-year mean	------	------	------	------	------	------	------	------	------	------	------	------	54.08

a Year incomplete.

Record of precipitation at Caliente, Kern County.

[Latitude, 35° 17′; longitude, 118° 41′; elevation, 1,290 feet. Authority, Pacific Railway System.]

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1875–76	------	------	------	------	------	2.02	1.66	0.53	T.	0	0	T.	a4.21
1876–77	0	0.52	T.	0	1.08	.47	1.08	1.27	(0.52)	0	0	0	4.94
1877–78	0	0	0.84	2.31	3.81	4.47	2.69	3.20	.03	0	0	0	17.35
1878–79	0	.42	.10	.10	.20	.34	.33	1.43	.20	0.04	0	0	3.16
1879–80	0	1.08	1.77	3.46	2.37	1.51	1.09	3.53	.23	0	0	0	15.04
1880–81	0	0	0.35	3.56	1.61	1.54	1.91	.64	.23	0	0	0	9.84
1881–82	0.13	0.81	.30	.51	1.51	3.30	.73	1.59	.69	.56	0	0	10.13
1882–83	0	1.01	.69	.37	.04	1.76	.82	2.42	1.07	0	0	0	8.18
1883–84	.08	.76	.05	(1.81)	2.00	4.98	5.00	2.90	1.10	1.28	0	0	19.96
1884–85	0	.22	.25	3.25	.25	0	.45	3.00	1.05	0	0.05	0	8.52
1885–86	0	.05	3.88	1.33	1.59	.66	2.62	2.65	0	0	T.	0	12.78
1886–87	0	T.	1.45	1.33	.38	2.79	.07	2.66	.21	0	0	0	8.89
1887–88	0	.63	.05	1.43	.87	1.14	1.50	0	.81	0	0	0	6.43
1888–89	0	0	6.14	2.18	.59	.20	3.15	.60	0	0	0	0	12.86
1889–90	0	1.35	1.05	3.65	(1.25)	1.15	1.10	0	1.62	0	0	0	11.17
1890–91	.52	0	0	4.30	.19	2.83	.40	1.60	0	0	0	0	9.84
1891–92	.27	.05	T.	3.73	.75	1.00	4.25	.30	1.00	.50	0	0	11.85
1892–93	0	0	0	2.80	1.00	2.15	3.71	.70	0	0	0	0	10.36
1893–94	0	.10	.20	3.45	3.30	1.40	1.60	.20	.50	.70	0	0	11.45
1894–95	.60	.20	.25	4.39	5.28	3.10	1.67	.85	.87	0	0	0	17.21
1895–96	0	2.31	1.51	1.20	2.53	.25	3.30	1.58	.56	0	.05	.29	13.58
1896–97	0	1.00	55	3.55	1.25	4.96	2.41	.35	.13	0	0	0	14.20
1897–98	0	.90	0	2.02	1.67	.70	1.45	.76	1.40	0	0	0	8.90
1898–99	.10	0	.45	.68	1.73	.41	3.26	.28	1.13	0	0	0	8.04
1899–1900	0	.25	1.52	.64	.50	.98	.80	1.75	2.35	0	0	0	8.79
1900–1901	0	0	2.13	0	.89	2.10	.35	1.33	1.18	0	0	0	7.98
1901–2	0	0	0	0	1.70	3.80	3.65	2.70	.11	(.12)	0	0	12.08
26-year mean	------	------	------	------	------	------	------	------	------	------	------	------	10.91

a Year incomplete.

Record of precipitation at Fort Tejon, Kern County.

[Latitude, 34° 55′; longitude, 118° 44′; elevation, 3,245 feet. Authority, United States War Department, and J. G. Stitt, Bakersfield.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1854–55	------	------	------	------	------	------	1.58	3.78	0.61	0	------	0	a 5.97
1855–56	0.99	0.05	0	7.50	4.41	7.88	2.24	4.98	4.62	0	0	0.30	32.97
1856–57	.08	.05	3.12	6.54	.37	.95	0	.04	.63	0	.07	.12	11.97
1857–58	0	2.11	1.04	4.50	2.60	.75	7.39	5.37	.09	1.20	0	.35	25.40
1858–59	.44	2.62	.25	3.07	.29	1.69	1.22	2.37	0	0	0	.07	12.02
1859–60	8.58	.16	1.02	0	.22	.25	.20	.60	.20	.21	.01	.16	11.61
1860–61	------	------	------	------	.73	.31	.26	T.	.43	------	------	T.	a 1.73
1861–62	------	------	------	------	------	------	------	------	------	------	------	------	------
1862–63	------	------	------	------	------	------	------	------	------	------	------	T.	------
1863–64	2.02	1.00	.71	4.32	.42	0	1.84	1.80	1.09	.04	T.	.10	13.34
1894–95	------	------	------	------	------	3.08	2.14	1.44	1.31	0	0	0	a 7.97
1895–96	0	1.46	1.42	1.25	3.07	.40	4.01	3.33	2.05	.22	.26	.30	17.77
1896–97	.53	1.63	1.74	4.47	3.52	5.14	3.63	.95	0	0	0	0	21.61
1897–98	0	1.39	0	1.72	1.89	1.55	1.36	.40	.30	0	0	0	8.61
1898–99	.60	0	.65	.73	2.57	.50	2.99	.55	.25	.78	0	0	9.62
1899–1900	.05	1.10	1.71	1.40	2.12	.66	.85	1.82	1.57	0	0	0	11.28
1900–1901	1.06	0	1.71	.50	1.80	5.86	1.97	.78	.90	0	0	T.	14.58
1901–2	.05	1.61	.26	T.	------	------	------	------	------	------	------	------	a 1.92
12-year mean	------	------	------	------	------	------	------	------	------	------	------	------	15.90

a Year incomplete.

Record of precipitation at Isabella, Kern County.

[Latitude, 35° 48′; longitude, 118° 25′; elevation, 2,600 feet. Authority, Stephen Barton, Isabella.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1895–96	------	------	------	------	------	0.10	1.93	0.89	0.04	0.06	2.57	0.01	a 5.60
1896–97	0.32	1.17	0.48	0.70	------	------	------	------	------	------	------	------	a 2.67
1897–98	.15	0	0	1.24	0.54	.99	.58	.06	.54	0	0	0	4.10
1898–99	.04	0	0	.33	1.95	.19	1.89	.28	.25	.45	0	0	5.38
1899–1900	0	.78	.85	.78	1.10	.65	.65	.73	1.06	0	0	.02	6.62
1900–1901	.30	.24	5.53	.05	1.20	2.74	.33	.36	1.98	0	0	.99	13.72
1901–2	0	.64	.13	0	.34	6.05	2.27	1.02	.05	0	0	0	10.50
5-year mean	------	------	------	------	------	------	------	------	------	------	------	------	8.06

a Year incomplete.

Record of precipitation at Keene, Kern County.

[Latitude, 35° 12′; longitude, 118° 40′; elevation, 2,705 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1877–78	0	0	0	1.75	4.37	7.49	2.72	2.10	0	0	0	0	18.43
1878–79	0	0.47	0	.74	.67	.55	.83	1.97	0	0	0	0	5.23
1879–80	0	.50	1.43	5.37	2.36	1.21	1.15	4.07	0.12	0	0	0	16.21
1880–81	0	.22	.26	3.43	2.12	2.42	1.96	.72	.19	0	0	0	11.32
1881–82	0.58	.21	.96	.30	1.40	2.57	1.42	1.44	.60	0.10	0	0	9.58
1882–83	0	1.40	.25	.47	.17	3.31	2.55	2.04	.86	0	0	0	11.05
1883–84	0	.45	.16	1.06	2.14	7.46	4.80	3.16	3.23	1.79	0	0	24.25
1884–85	0	2.55	.36	5.22	.30	.13	.65	1.47	.11	.10	0.06	T.	10.95
1885–86	0	.28	3.73	.46	2.02	.64	2.93	2.84	0	T.	T.	0.02	12.92
1886–87	0	T.	1.95	1.10	.51	3.20	.92	2.73	T.	.20	T.	0	10.61
1887–88	.12	1.32	.50	1.72	1.30	1.70	2.69	.78	2.03	0	.68	0	12.84
1888–89	0	0	1.28	2.29	.36	0	3.74	.95	1.77	0	0	.28	10.67
1889–90	.42	2.23	1.30	5.17	3.15	1.97	1.98	.50	1.30	0	0	1.40	19.42
1890–91	.41	0	.10	3.57	.23	6.59	1.30	1.30	1.35	.05	0	0	14.90
1891–92	.22	0	.08	6.37	1.65	2.22	4.10	1.86	.60	1.07	0	0	18.17
1892–93	0	.16	.65	1.98	2.20	3.26	6.70	1.30	T.	0	1.05	0	17.30
1893–94	.14	.35	.18	1.50	3.60	1.65	2.25	.55	.40	.20	0	0	10.82
1894–95	.35	.05	.30	4.59	6.03	2.71	2.40	1.95	1.25	0	0	0	19.63
1895–96	0	1.37	1.65	1.90	.82	0	2.47	2.82	1.30	0	.15	.40	12.88
1896–97	0	0	1.01	2.94	2.28	7.49	3.17	.14	0	.59	0	0	17.62
1897–98	0	1.01	0	3.02	1.73	.75	2.04	.35	1.12	0	0	0	10.02
1898–99	.03	0	.40	.62	.41	1.17	4.10	.66	1.18	.79	0	0	9.36
1899–1900	0	.61	3.16	.90	.92	1.12	.54	2.57	1.55	0	0	0	11.37
1900–1901	.27	.70	1.94	0	.99	5.35	1.30	1.19	.80	0	0	.89	13.43
1901–2	0	.45	.26	.30	1.56	6 91	4.80	2.70	.45	0	0	0	17.43
25-year mean													13.86

Record of precipitation at Kernville, Kern County.

[Latitude, 35° 45′; longitude, 118° 27′; elevation, 2,600 feet. Authority, Stephen Barton and A Brown, Kernville.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94					1.10	1.88	0.42	0.17	0.53	0	0	0.01	[a]4.11
1894–95	0.60	0	0	5.31	5.10	1.55	1.80	.37	0	0	0	0	14.73
1895–96	0	0.50	0.95	.40	3.52	0	1.54	.86	0	0.20	2.25	.05	10.27
1896–97	0	1.48	.41	.85	3.40	3.60	2.57	.10	0	0	0	0	12.41
1897–98	0	45	1.14	11.32	.58	.99	.58	T.	.54	0	0	0	15.60
1898–99	.04	0	0	.33	1.95	.19	1.89	.28	.25	.45	0	0	5.38
1899–1900	0	.78	.85	.73	.80	.53	.58	.52	90	0	0	0	5.69
1900–1901	.79	.10	5.09	0	1.35	2.92	.15	.31	1.62	0	0	.70	13.03
1901–2	0	.72	.15	0	.30	3.07	2.10	.74	.10	.00	.00	.00	7.18
7-year mean													11.02

[a] Year incomplete.

Record of precipitation at Mount Breckinridge, Hanlon, Kern County.

[Latitude, 35° 25′; longitude, 118° 35′; elevation, 6,750 feet. Authority, G. Otterman.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr	May.	June.	July.	Aug.	Total.
1896-97	------	------	2.26	5.95	2.70	5.12	7.72	0	0.40	0.10	0	0	[a]24.25
1897-98[b]	------	------	------	------	------	------	------	------	------	------	------	------	------
1898-99	------	------	------	------	------	1.79	3.17	------	------	------	------	------	[a]4.96

[a] Year incomplete. [b] No record kept in 1898.

Record of precipitation at Taylor's ranch, Weldon, Kern County.

[Latitude, 35° 30′; longitude, 118° 17′; elevation, 2,640 feet. Authority, Geo. E. Carleton and Annie Alexander, Weldon.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1899-1900	------	------	0.78	0.66	0.71	0.47	0.50	0.39	0.82	0.02	0	0.03	[a]4.38
1900-1901	0.62	0.02	4.29	0	1.06	1.96	.05	.41	1.02	0	0	2.60	12.03
1901-2	0	.39	.12	0	.26	4.37	1.41	.31	0	0	0	0	6.86
2 year mean	------	------	------	------	------	------	------	------	------	------	------	------	9.45

[a] Year incomplete.

Record of precipitation at Tehachapai, Kern County.

[Latitude, 35° 06′; longitude, 118° 26′; elevation, 3,964 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr	May	June.	July.	Aug.	Total.
1876-77	0.08	0.45	0	0	0.58	0.14	0.89	0.60	0.12	0	0.02	0	2.88
1877-78	0	T.	0.50	2.91	2.59	6.32	1.76	1.93	.28	0.09	0	T.	16 38
1878-79	0	.30	.04	.64	2.62	.45	.19	1.39	.09	.12	0	0	5.84
1879-80	0	.52	1.03	5.52	2.81	1.94	1.47	2.30	0	0	0	0	15.59
1880-81	0	.75	.10	2.14	1.79	2.05	3.15	.50	0	0	0	0	10.48
1881-82	.32	.10	.50	.12	1.05	2.07	1.45	.63	.20	.15	0	0	6.59
1882-83	0	.74	.18	.50	.15	4.55	1.51	2.89	1.73	0	0	0	12.25
1883-84	0	.81	.14	.72	1.54	7.57	3.48	1.85	1.26	1.05	0	0	18.42
1884-85	0	.13	.29	3 96	.10	0	.26	1.48	.30	0	.05	.31	6.88
1885-86	0	0	3.70	.52	1.58	6.06	4.10	4.57	0	0	.10	0	20.63
1886-87	0	T.	1.15	.60	.50	8.88	.24	1.95	.26	0	0	0	13.58
1887-88	0	.86	.26	1.44	2.57	2.60	1.20	1.25	.25	0	0	0	10.43
1888-89	0	0	0	3.65	.40	.60	3.56	3.96	1.07	0	0	.80	14.04
1889-90	0	2.70	.70	5.30	1.75	.70	.30	0	0	0	0	0	11 45
1890-91	.50	0	0	3.48	.03	3.45	.80	.90	.70	(0.00)	0	0	9.86
1891-92	1.17	0	0	3.10	.92	2.68	2.72	.61	.55	0	0	0	11 75
1892-93	0	0	0	.40	.85	3.61	5.00	.65	0	0	0	0	10.51
1893-94	0	.50	.50	5.25	2.80	1.68	0	(.18)	.32	.27	0	0	11.50
1894-95	.10	0	0	3.75	3.21	.69	1.08	.50	.75	0	0	0	10.08
1895-96	0	.44	.60	.26	1.57	0	2.80	.63	0	0	0	.85	7.15
1896-97	0	1.45	.53	1.13	1.78	2.03	.18	.25	0	0	0	0	7.35
1897-98	.02	.38	0	1.00	1.20	.34	1.35	.10	.82	0	0	0	5.21
1898-99	0	0	T.	.20	.68	.60	1.62	0	.22	.38	0	0	3.70
1899-1900	0	.57	1.53	.61	.64	.39	.29	1.29	.50	23	T.	0	6.05
1900-1901	0	.46	1.53	0	1.17	3.29	.25	.28	.79	0	0	1.70	9.47
1901-2	0	.50	0	0	.80	3.90	1.05	1 73	0	0	0	0	7.38
26-year mean	------	------	------	------	------	------	------	------	------	------	------	------	10.23

Record of precipitation at Tejon Ranch, Kern County.

[Latitude, 35° 01′; longitude, 118° 45′; elevation, 1,450 feet. Authority, R. M. Pogson, Bakersfield.]

Year.	Sept.	Oct	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1894–95	------	------	------	------	5.05	1.39	1.70	1.11	.49	0	0	0	[a]9.74
1895–96	0	2.13	1.41	1.06	1 90	.37	4.22	1.62	.48	0	0	0	13.19
1896–97	------	------	2.12	------	------	------	------	------	------	------	------	------	[a]2.12
1897–98	------	------	------	------	2.32	1.68	.94	.17	.84	0	0	0	[a]5.95
1898–99	0.34	.42	.57	.87	1.30	2.10	4.03	.82	0	0	0	0	10.45
1899–1900	0	1.31	1.82	1.67	1.17	.35	.41	1.97	1.57	.02	0	0	10.29
1900–1901	06	67	1.06	.34	1.28	4.69	.95	1.36	1.28	0	0	T.	11.69
1901–2	0	.40	.17	.60	1.61	1.46	2.74	2.02	.98	0	0	0	9.98
5-year mean	------	------	------	------	------	------	------	------	------	------	------	------	11.12

[a] Year incomplete.

Record of precipitation at Bartlett Springs, Lake County.

[Latitude, 39° 10′; longitude, 122° 45′; elevation, 2,375 feet. Authority, J. E. McMahon.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1896–97	------	------	------	------	3.50	6.78	5.36	0.75	0	0	0	0	[a]16.39
1897–98	0	1.70	2.31	3.72	1.53	8.36	.19	.63	2.39	1.10	0	0	21.93
1898–99	0	0	1.87	1.23	13.14	0	8.49	.85	2.47	0	0	0	28.05
1899–1900	0	4.79	10.06	7.87	7.51	1.27	6.42	3.23	.88	0	0	0	42.03
1900–1901	------	------	------	------	14.59	7.62	1.67	4.52	1.40	0	0	0	[a]29.80
1901–2	1.17	1.80	5.86	4.02	1.71	22.38	5.98	5.20	3.40	0	0	0	51.52
4-year mean	------	------	------	------	------	------	------	------	------	------	------	------	35.88

[a] Year incomplete.

Record of precipitation at Kono Tayee, Lake County.

[Latitude, 39° 5′; longitude, 122° 43′; elevation, 1,350 feet. Authority, R. S. Floyd.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1873–74	0	0	0	0	1.88	3.60	4.62	2.05	0.45	0	0	0	12.60
1874–75	0	3.70	6.25	0.29	9.16	.38	.92	0	.84	0.42	0	0	21.96
1875–76	0	1.17	6.96	5.12	6.05	4.22	8.34	.10	0	0	0	0	31.96
1876–77	0	.20	3.50	0	3.17	2.81	1.40	.50	0	.50	0	0	12.08
1877–78	0.73	1.65	2.23	1.98	14.16	11.04	4.60	1.43	0.79	.45	0	0.07	39.13
1878–79	0	.41	1.37	.33	3.01	3.41	9.15	.47	.64	0	0	.05	18.84
1879–80	0	.91	3.57	5.72	6.24	3.85	4.74	.48	.25	0	0	0	25.76
1880–81	0	0	3.54	1.92	5.50	6.58	.64	.95	.12	.25	0	0	19.50
1881–82	0	.63	2.90	1.77	1.74	3.20	2.34	1.54	.40	0	0	0	14.52
1882–83	.42	1.64	4.42	.98	1.40	.60	3.81	.95	2.41	0	0	0	16.63
1883–84	.70	.99	.39	.70	4.17	1.91	5.35	3.88	.06	4.08	0	0	22.23
1892–93	.18	.84	6.53	5.57	3.84	4.15	5.41	2.06	.66	0	0	0	29.24
1893–94	.25	.42	3.76	2.34	6.92	4.32	1.11	.91	.90	1.64	0	T.	22.57
1894–95	.50	1.22	.74	10.70	14.45	2.32	3.13	.98	1.14	0	0	T.	35.18
1895–96	.71	0	1.69	2.12	9.42	.25	2.31	4.62	1.69	.45	T.	.27	23.53
1896–97	.29	.73	3.33	5.93	2.85	4.01	3.76	.90	.90	.48	0	0	23.18
1897–98	0	1.24	1.64	2.12	.71	4.19	.11	.64	1.67	.45	0	0	12.77
1898–99	.51	.46	1.15	1.27	7.74	T.	5.43	.70	.45	.28	.18	T.	18.17
1899–1900	0	3.78	5.56	4.14	3.10	1.27	2.89	2.32	.67	T.	0	0	23.73
1900–1901	T.	3.11	3.89	1.67	5.57	4.33	1.33	2.05	.96	.45	0	T.	23.36
1901–2	.54	1.04	3.87	1.19	1.31	10.28	3.85	2.42	1.59	0	0	T.	26.09
21-year mean	------	------	------	------	------	------	------	------	------	------	------	------	22.53

Record of precipitation at Lakeport, Lake County.

[Latitude, 123° 0′; longitude, 39° 0′; elevation, 1,325 feet. Authority, D. C. Rumsey.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Total.
1900–1901	0	4.25	5.55	4.20	9.20	3.95	1.25	2.15	0.62	0	0	0	31.17
1901–2	.88	2.20	4.18	0	3.00	12.86	3.70	3.30	2.45	0	0	0	32.57
2-year mean													31.86

Record of precipitation at Middletown, Lake County.

[Latitude, 38° 46′; longitude, 122° 37′; elevation, 1,300 feet. Authority, Leon Lake.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1879–80	0.91	1.36	8.38	9.59	7.07	2.48	4.64	22.21	1.76	0	0	0	58.40
1880–81	0	0.06	0.02	21.86	17.85	5.95	1.83	2.52	0.29	0.34	0	0	50.72
1881–82	.55	1.26	1.05	8.09	2.86	6.80	4.60	2.57	.65	0	0	0	28.43
1882–83	.90	2.93	5.07	1.47	2.25	1.92	7.25	3.69	3.97	0	0	0	29.45
1883–84	2.55	1.36	.57	2.34	8.25	5.25	12.82	8.36	.06	3.28	0	0	44.84
1884–85	.50	2.08	.05	22.93	2.54	1.37	12.82	8.42	.30	2.98	0	0	53.99
1885–86	.15	.54	19.42	6.60	13.61	0.32	0.70	1.32	0	.27	0	0	42.93
1886–87				3.96	2.25	10.74	1.71	8.03	1.64	0			[a]28.33
1892–93	.91	2.05	15.64	14.77	6.25	7.82	9.32	3.88	1.49	0	0	0	62.13
1893–94	.78	.36	3.06	3.36	14.37	8.32	2.09	2.65	2.06	.89	0	0	37.94
1894–95	1.28	3.18	1.92	20.52	28.90	3.40	5.87	1.77	1.75	0	0.10	0	68.69
1895–96	1.86	0	3.06	5.59	25.78	.06	5.79	8.54	2.23	0	.01	0.10	53.02
1896–97	.48	1.10	7.55	11.21									[a]20.34
11-year mean													48.23

[a] Year incomplete.

Record of precipitation at Susanville, Lassen County.

[Latitude, 40° 23′; longitude, 120° 35′; elevation, 4,195 feet. Authority, T. B. Sanders.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1885–86	0.71	0.50	5.92	3.23	4.27	0.92	2.70	1.70	1.28	1.22	0.57	0.30	23.32
1886–87		1.32		2.23		5.57							[a]9.12
1887–88													
1888–89	.71	.01	1.45	1.89	.03	.60	4.81	1.07	6.26	1.55	.05	0	18.43
1889–90	0	4.18	2.74	8.55	8.72	4.71	4.60	1.03	1.51	.14	0	.15	36.36
1890–91	.15	T.	.35	3.47	1.00	7.84	2.49	.80	2.41	1.65	.55	T.	20.71
1891–92	.65	.45	1.10	4.91	1.77	2.96	2.80	2.80	1.35	.98	0	0	19.77
1892–93	.71	.83	10.66	6.80	4.82	3.53	1.55	1.83	.67	0	T.	T.	31.40
1893–94	1.65	.60	1.80	.95	6.10	3.53	2.35	.95	1.55	.75	0	.20	20.43
1894–95	.30	1.96	.40	8.66	10.29	3.00	1.26	.50	1.50	T.	T.	.20	28.07
1895–96	3.00	.10	1.95	2.91	6.94	.05	3.23	5.10	2.22	T.	.20	.20	25.90
1896–97	1.33	.50	3.88	2.96	5.99	4.25	2.60	.30	.90	.42	0	.08	23.21
1897–98	.55	2.65	3.13	2.22	.45	2.38	.35	.24	.54	1.02	0	.08	13.61
1898–99	.10	.80	1.74	.65	2.90	.31	3.32	.92	1.42	0	0	.46	12.62
1899–1900	0	5.21	2.70	3.59	1.50	1.22	2.97	.90	.64	.40	.63	.02	19.78
1900–1901	.25	2.67	3.29	2.00	4.76	3.17	1.50	1.57	.92	.27	0	1.77	22.17
1901–2	.59	2.28	1.72	1.89	.70	5.14	2.56	1.31	.35	0	.54	.09	17.17
15-year mean													22.20

[a] Year incomplete.

Record of precipitation at Azusa, Los Angeles County.

[Latitude, 34° 8′; longitude, 117° 54′; elevation, 630 feet. Authority, H. F. Parkinson.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1897–98	0	4.25	0.25	T.	1.75	1.25	0.81	0.25	2.63	T.	T.	0	11.19
1898–99	.06	T.	T.	0.50	2.81	T.	2.49	T.	T.	1.25	0	T.	7.11
1899–1900	T.	2.55	1.79	1.00	1.31	T.	1.71	1.05	2.79	0	0	0	12.20
1900–1901	.13	.34	10.25	0	3.77	4.86	.50	.73	1.91	T.	T.	T.	22.49
1901–2	T.	2.35	.67	T.	2.24	2.84	3.99	.38	.18	.08	T.	0	12.73
5-year mean													13.14

Record of precipitation at Calabasas, Los Angeles County.

[Latitude, 34° 09′; longitude, 118° 38′; elevation, 925 feet. Authority, J. G. Chapman.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1901–2				0	1.28	4.35	2.17	0	0	0	0	0	7.80

Record of precipitation at Colby's Camp, Los Angeles County.

[Latitude, 118° 05′; longitude, 34° 15′; elevation, 3,875 feet. Authority, D. W. Colby, Pasadena.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1898–99					2.90	0.25	2.75	0.17	0.60	0.79	0	0	[a]7.46
1899–1900	0	3.66	1.25	1.26	1.15	0	2.00	1.38	3.25	0	0	0	13.95
1900–1901	0.25	.45	8.15	0	6.94	13.54	.67	2.65	1.10	.10	0	0.25	34.10
1901–2	.10	3.15	0	0	2.50	3.15	3.55	1.84	.20	.10	0	0	14.59
3-year mean													20.88

[a] Year incomplete.

Record of precipitation at Follows Camp (Azusa), Los Angeles County.

[Latitude, 34° 14′; longitude, 117° 49′; elevation, 1,800 feet. Authority, R. M. Follows, Azusa.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1895–96				1.02	2.77	T.	6.55	0.70	0.36	0	0.07	1.10	[a]12.57
1896–97	T.	2.95	1.03	1.61	5.43	10.39	8.25	.15	.28	T.	0	.07	30.16
1897–98	.45	7.85	.20	.27	0	9.80	0	.85	6.16	1.03	0	.53	27.14
1898–99	0	0	1.70	.70	3.59	.84	2.49	.12	0	.91	0	0	10.35
1899–1900	.12	3.03	1.64	.44		T.	2.40	1.77	2.98				[a]12.38
1901–2			.80	.15									[a].95
3-year mean													22.55

[a] Year incomplete.

Record of precipitation at La Liebre, Los Angeles County.

[Latitude, 34° 46′; longitude, 118° 40′; elevation, 3,170 feet. Authority, J. W. Forbes, Neenack.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1896–97	------	------	------	------	3.67	4.01	2.30	0.10	------	------	------	------	[a] 10.08
1897–98	------	0.50	------	0.40	.53	.38	.81	0	0.45	0	0	0	[a] 3.07
1898–99	0.20	0	0	.66	1.79	.04	2.26	.09	.04	0.27	0	0	5.35
1899–1900	.05	1.47	0.90	.46	1.24	------	------	------	------	------	------	------	[a] 4.12

[a] Year incomplete.

Record of precipitation at Los Angeles, Los Angeles County.

[Latitude, 34° 03′; longitude, 118° 15′; elevation, 330 feet. Authority, Signal Service and Weather Bureau.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1871–72	------	------	------	------	------	2.25	0.43	0.97	0.10	0	0	0.22	[a] 3.97
1872–73	0	0	0	4.42	2.08	7.19	.05	0	0	0	0	1.06	14.80
1873–74	0	0	0.74	5.74	5.51	9.77	1.09	.45	.42	0	0	0	23.72
1874–75	0.06	1.81	1.89	.20	17.22	.15	.22	.07	.05	0	0	0	21.67
1875–76	0	0	7.57	.82	6.54	7.92	3.41	.45	.03	0	0	0	26.74
1876–77	0	40	0	0	3.48	.01	.83	.26	.30	0	0	0	5.28
1877–78	0	.86	.45	3.93	3.33	7.68	2.57	1.71	.66	0.07	0	0	21.26
1878–79	0	.14	0	4.70	3.59	.97	.49	1.19	.24	.03	0	0	11.35
1879–80	0	93	3.44	6.53	1.33	1.56	1.45	5.06	.04	0	T.	T.	20.34
1880–81	0	.14	.67	8 40	1.43	.36	1.66	.46	.01	0	0	T.	13.13
1881–82	T.	.82	.27	.52	1.01	2 66	2.66	1.83	.63	T.	0	0	10.40
1882–83	T.	.05	1.82	.08	1.62	3.47	2.87	.15	2.02	.03	T.	0	12.11
1883–84	0	1.42	0	2.56	3.15	13.37	12.36	3.58	.39	1.39	0.02	.02	38.26
1884–85	T.	.39	1.07	4.65	1.05	.01	.01	2.01	.06	T.	T.	T.	9.25
1885–86	.05	30	5.55	1.65	7.78	1.41	2.52	2.32	,01	.11	.27	.21	22.18
1886–87	.11	.02	1.18	26	.20	9.25	.29	2.36	.20	.07	.07	T.	14.01
1887–88	.18	.17	.80	2.68	6.04	.80	3.17	.12	.05	.01	.04	.10	14.16
1888–89	.03	.40	4.02	6.26	.25	.92	6.48	.27	.65	.01	T.	.28	19.57
1889–90	.34	6.96	1.35	15.80	7.83	1.36	.66	.22	.03	.02	0	.03	34.60
1890–91	.06	.03	.13	2.32	.25	8.56	.41	1.26	.31	0	T.	0	13.33
1891–92	.06	0	0	1.99	.88	3.19	3.39	.22	2.06	.06	0	.01	11.86
1892–93	0	.33	4.40	4.18	6.29	2.27	8.52	.19	.06	.03	0	0	26.27
1893–94	T.	.75	.20	3.65	.94	.49	.37	.13	.20	T.	T.	.01	6.74
1894–95	.73	.02	0	4.62	5.84	.46	3.77	.46	.19	01	T.	T.	16.10
1895–96	T.	.24	.80	.78	3.23	T.	2.97	.19	.30	T.	.02	.01	8.54
1896–97	T.	1.30	1.66	2.12	3.70	5.62	2.31	.02	.10	T.	T.	0	16.83
1897–98	0	2.47	.01	.05	1.26	.51	.98	.03	1.75	T.	.07	T.	7.13
1898–99	02	.09	T.	.12	2.64	.04	1.81	.18	.04	.58	0	.01	5.53
1899–1900	T.	1.59	.90	.90	1.17	T.	.99	.54	1.81	T.	T.	T.	7.90
1900–1901	T	.26	6.53	T.	2.49	4.38	.45	.68	1.50	T.	T.	.09	16.38
1901–2	.03	1.88	46	0	1.62	3.35	2.98	.16	.03	T.	0	0	10.51
30 year mean	------	------	------	------	------	------	------	------	------	------	------	------	16.00

[a] Year incomplete.

Record of precipitation at Magic Hill, No. 1, Los Angeles County.

[Latitude, 34° 23′; longitude, 118° 22′; elevation, 2,820 feet. Authority, B. L. Hutchins, Burbank.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1897–98	.....	.....	0.10	0.30	0.25	0.61	0	0.34	0.29	1.80	1.35	0.52	[a]5.56
1898–99	3.12	.....	.....	.....	1.60	.15	2.07	.14	1.65	.05	0	0	[a]8.78
1899–1900	.07	2.25	1.07	1.20	1.34	0	1.67	2.05	4.40	.06	.04	0	14.15
1900–1901	.54	.71	6.53	0	6.71	6.68	.78	1.79	.57	.....	.....	.....	[b]24.31

[a] Year incomplete. [b] Record stopped.

Record of precipitation at Manzana, Los Angeles County.

[Latitude, 34° 45′; longitude, 118° 35′; elevation, 2,850 feet. Authority, E. A. Silrey.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94	.....	.....	.....	.....	0.21	0.37	0.36	T.	0.35	0.17	0	0.10	[a]1.56
1894–95	0.49	0	0	3.60	2.79	0	1.36	0.08	T.	0	0	0	8.32
1895–96	0	0.40	0.48	.18	1.09	0	1.70	.63	T.	0	0	.10	4.58
1896–97	0	.61	.30	1.46	2.70	3.04	1.71	.04	.01	T.	T.	.28	10.15
1897–98	0	.21	T.	.14	.63	.02	.47	0	.24	0	0	0	1.71
1898–99	T.	0	0	.50	1.15	T.	1.35	.04	.09	.04	0	0	3.17
1899–1900	0	1.27	.71	.29	1.11	.10	.93	.42	.38	0	0	.08	5.29
1900–1901	.10	.09	2.55	0	3.20	6.68	.25	.61	.12	0	0	.65	14.25
1901–2	T.	2.02	.20	T.	.67	1.52	1.14	0	.15	T.	0	0	5.70
8-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.65

[a] Year incomplete.

Record of precipitation at Mount Lowe (Echo Mountain post-office), Los Angeles County.

[Latitude, 34° 15′; longitude, 118° 07′; elevation, 3,200 feet. Authority, Louis Swift and Edgar L. Larkin.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1895–96	.....	.....	.....	1.35	2.85	0.10	4.10	0.60	0.30	0	0	0	[a]9.30
1896–97	0	2.39	1.55	2.17	6.42	7.47	6.67	.19	.87	0.10	0.15	0	27.98
1897–98	0	2.57	.40	.22	1.55	2.22	1.65	2.70	2.17	0	0	0	13.48
1898–99	0.25	.30	0	.98	3.29	0	3.40	.20	1.90	.40	0	0	10.72
1899–1900	0	3.00	2.85	.....	.....	.....	2.90	2.15	4.05	.40	T.	0	[a]15.35
1900–1901	.25	1.66	11.71	0	7.55	5.42	1.18	1.14	4.45	.75	0	0	34.11
1901–2	0	4.18	1.05	.23	1.88	3.48	5.97	1.35	.33	.30	0	0	18.77
5-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21.01

[a] Year incomplete.

Record of precipitation at Mount Sister Elsie, Los Angeles County.

[Latitude, 34° 17′; longitude, 118° 14′; elevation, 5,021 feet. Authority, L. T. Rowley, Monte Vista.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1898–99	.....	.....	.....	.....	2.95	0.12	3.37	0.58	0.08	0.78	0	0	[a]7.88
1899–1900	0.35	2.10	1.34	0.41	.85	0	1.87	1.30	3.02	0	0	T.	11.24
1900–1901	.09	.81	6.70	0	8.92	12.13	.95	3.60	1.93	.....	.....	.....	[c]35.13

[a] Year incomplete. [c] Record discontinued.

Record of precipitation at Newhall, Los Angeles County.

[Latitude, 34° 25′; longitude, 118° 33′; elevation, 1,268 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1876–77	0	0	0	0	1.56	T.	0.43	0.50	0.56	0	0	0	3.05
1877–78	0	0.03	0.32	1.45	3.78	3.23	1.02	1.46	.15	0	0	0	11.44
1878–79	0	0	0	2.33	2.25	.62	0	1.52	.05	0	0	0	6.77
1879–80	0	.37	3.10	9.23	.10	2.25	1.08	3.39	0	0	0	0	19.52
1880–81	0	0	.26	6.22	.57	.06	1.70	.34	0	0	0	0	9.15
1881–82	0	1.23	.12	4.21	.43	2.36	4.71	.93	0	0	0	0	13.99
1882–83	0	.16	1.20	0	1.96	2.95	3.07	0	2.28	0	0	0	11.62
1883–84	0	.16	0	3.34	6.66	14.53	9.73	3.85	2.17	1.67	0	0	42.11
1884–85	0	.60	1.10	3.89	.47	0	.07	1.75	0	.06	0.02	0	7.96
1885–86	0	0	9.01	2.25	5.22	.69	3.11	4.27	0	T.	0	0	24.55
1886–87	0	0	.87	.21	0	12.38	.15	1.96	.10	.03	0	0	15.70
1887–88	0.02	.65	1.46	4.26	6.74	1.17	4.21	.29	.04	0	0	0	18.84
1888–89	0	.40	3.69	5.64	.35	(.08)	9.39	.40	.56	0	0	0.36	21.59
1889–90	0	(2.50)	3.36	15.70	6.30	4.41	.44	.33	(0.00)	0	0	0	33.04
1890–91	.35	0	0	1.94	.31	9.99	.88	1.26	.66	0	T.	0	15.39
1891–92	.13	0	0	2.12	1.32	3.02	4.07	.06	2.08	0	0	0	12.80
1892–93	0	.30	4.72	4.16	3.91	1.34	7.90	.47	.34	0	0	0	23.14
1893–94	0	.72	0	3.90	.85	.29	.62	.15	.66	0	0	0	7.19
1894–95	.80	0	0	7.59	7.11	.31	3.66	.39	0	0	0	0	19.86
1895–96	0	.10	1.09	.11	2.15	.15	4.04	1.03	.20	0	0	.25	9.12
1896–97	0	1.55	1.00	2.23	4.86	5.08	3.32	0	.08	0	0	0	18.12
1897–98	0	1.00	0	0	.45	3.14	0	.10	.93	0	0	0	5.62
1898–99	.14	0	0	.22	2.77	0	1.98	.08	0	.25	0	0	5.44
1899–1900	0	1.63	.90	.64	.89	0	1.97	.25	1.31	0	0	0	7.59
1900–1901	0	.08	5.24	0	5.13	6.14	.13	.74	1.62	0	0	0	19.08
1901–2	.10	2.32	.70	0	1.00	2.90	2.53	.34	0	0	0	0	9.89
26-year mean													15.10

NOTE.—February and October, 1889, and May, 1890, estimated by War Department.

Record of precipitation at Palmdale (Headworks), Los Angeles County.

[Latitude, 34° 25′; longitude, 118° 03′; elevation, 3,299 feet. Authority, Burt. Cole and S. T. Berkley.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1895–96	T.	T.	0.75	0.10	1.00	T.	2.50	T.	0	0	0.25	1.35	5.95
1896–97	0.32	1.42	.43	.98	3.78	3.71	1.31	0.04	0.32	0	.03	1.57	13.91
1897–98	T.	.86	0	.14	2.38	.07	.90	0	.21	0	.02	.05	4.63
1898–99	0	0	T.	.87	1.00	.31	.97	0	0	0	0	0	3.15
1899–1900	0	1.28	.27	.32	.65	0	.80	.57	.76	0	0	0	4.65
1900–1901	0	.20	1.79	0	1.34	4.50	.38	.15	T.	0	0	.33	8.69
1901–2	T.	.32	.04	0	1.17	1.08	1.96	.20	0	T.	0	0	4.77
7-year mean													6.86

Record of precipitation at San Fernando, Los Angeles County.

[Latitude, 34° 16′; longitude, 118° 26′; elevation, 1,066 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1877–78	0	0.04	0.48	2.36	4.15	6.89	2.08	2.55	0.36	0	0	0	18.91
1878–79	0	.16	.09	1.20	3.97	.86	.18	1.41	0	0	0	0	7.87
1879–80	0	.33	2.15	6.29	.95	2.00	1.14	2.97	0	0	0	0	15.83
1880–81	0	0	.86	4.72	1.28	.34	1.75	.50	0	0	0	0	9.45
1881–82	0	.95	.16	.32	.62	1.70	3.21	1.56	.10	0	0	0	8.62
1882–83	0	.28	.68	0	1.32	3.17	1.30	.13	2.12	0	0	0	9.00
1883–84	0	.70	0	2 76	3.00	10.60	10.51	3.48	1.05	2.00	0	0	34.10
1884–85	0	.42	1.00	4.96	.90	0	T.	1.48	.21	0	0	0	8.97
1885–86	0	0	7.94	1.17	6.70	T.	3.36	3.39	0	0	0.19	T.	22.75
1886–87	0	.78	.87	.24	.21	8.54	.27	2.52	T.	0	0	0	13.43
1887–88	.04	.22	.90	1.41	5.09	1.39	3.40	.44	0	0	0	0	12.89
1888–89	0	.36	3.24	5.40	.09	.63	8.95	.56	.43	0	0	0.06	19.72
1889–90	.32	6.17	1.60	14.40	5.40	2.72	.53	.05	.10	0	0	0	31.29
1890–91	.36	0	.18	1.61	.30	6.32	1.23	.96	.98	0	0	0	11.94
1891–92	.12	0	0	1.03	.57	2.53	2.65	.21	1.68	0	0	0	8.79
1892–93	0	.40	1.48	4.40	2.63	3.67	6.93	.56	.08	0	0	0	20.15
1893–94	0	.61	.05	2.23	.59	.61	.75	.24	.32	0	0	0	5.45
1894–95	0	.02	0	5.82	7.62	1.11	3.72	.55	.28	0	0	0	19.12
1895–96	0	.21	.90	.61	2.42	.05	3.32	.29	.15	0	0	.33	8.28
1896–97	0	1.48	.96	2.12	5.39	5.58	2.88	0	0	0	0	0	18.41
1897–98	0	1.66	0	0	1.42	.57	.86	.10	1.42	0	.17	0	6.20
1898–99	.10	.25	0	.20	1.29	0	1.45	0	T.	.68	0	0	3.97
1899–1900	0	1.65	.82	1.04	1.31	0	1.45	.25	1.87	0	0	0	8.39
1900–1901	T.	.14	6.19	0	4.17	5.20	.15	.72	.62	0	0	0	17.19
1901–2	T.	1.40	.50	0	1.05	2.72	2.80	.29	0	0	0	0	8.76
25-year mean													13.98

Record of precipitation at San Gabriel Electric Company's power house, Azusa, Los Angeles, County.

[Latitude, 34° 09′; longitude, 117° 54′; elevation, 1,000 feet. Authority, San Gabriel Electric Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1900–1901	0.19	0	9.76	0	5.23	3.81	0.58	1.35	1.87	0	0	0.03	12.87
1901–2	0	3.15	.64	0	1.98	3.03	4.69	.36	.23	0.14	0	0	14.22
2-year mean													13.55

Record of precipitation at San Gabriel Electric Company's headgate, Los Angeles County.

[Latitude, 34° 13′; longitude, 117° 52′; elevation, 1,100 feet. Authority, San Gabriel Electric Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1900–1901	0.10	0	11.25	0	6.44	5.09	0.48	1.15	2.90	0	0	0.02	27.43
1901–2	0	4.58	1.08	.18	1.83	3.61	6.24	1.35	.10	.19	0	0	19.16
2-year mean													23.30

Record of precipitation at San Gabriel Electric Company's Sierra power house, Los Angeles County.

[Latitude, 34° 13′; longitude, 117° 40′; elevation, 2,750 feet. Authority, San Gabriel Electric Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1900–1901	------	------	------	------	10.35	8.15	0.78	0.36	2.78	0.01	0	0	[a]22.43
1901–2	0	3.99	0.97	0.24	2.13	3.45	7.53	1.13	.20	.11	.03	0	19.78

[a] Year incomplete.

Record of precipitation at Coulterville, Mariposa County.

[Latitude, 37° 43′; longitude, 120° 12′; elevation, 1,660 feet. Authority, N. C. Ray.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1898–99	0	0	0.76	2.04	4.69	0.46	8.85	0.53	0.34	0.97	0	0	18.64
1899–1900	0	4.37	5.70	3.32	2.01	.60	1.47	2.90	1.14	.33	0	0	21.84
1900–1901	0.18	3.82	8.27	1.39	4.99	8.04	1.28	.66	3.29	T.	T.	T.	31.92
1901–2	1.35	1.92	2.09	1.39	0	0	0	0	0	.09	0	T.	6.82
4-year mean	------	------	------	------	------	------	------	------	------	------	------	------	19.81

Record of precipitation at Yosemite, Mariposa County.

[Latitude, 37° 45′; longitude, 119° 35′; elevation, 4,063 feet. Authority, Galen Clark.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1896–97	0 85	1.36	6.19	9.33	6.62	11.53	16.32	0.40	0 62	0.16	------	------	[a]53.38

[a] Year incomplete.

Record of precipitation at Camp Wright, Mendocino County.

[Latitude, 39° 45′; longitude, 123° 00′; elevation, 1,800 feet. Authority, U. S. War Department.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1864–65	0.03	0.85	6.19	12.20	3.64	4.88	3.57	0.36	0.43	0	0	0	32.15
1865–66	.81	.87	16.67	2.05	15.83	4.30	11.80	1.05	------	------	------	------	[a]53.38
1866–67	0	0	5.92	24.67	8.92	7.85	2.38	3.10	.01	0	0	0	52.85
1867–68	1.56	3.75	6.38	29.03	8.61	5.89	9.11	3.25	.71	1.58	0	0	69.87
1868–69	.05	.25	2.79	6.63	13.57	4.13	3.80	4.51	.55	0	0	0	36.28
1869–70	1.42	.84	5.38	8.06	7.03	6.61	2.40	2.02	.39	0	0	0	34.15
1870–71	0	0	1.28	1.19	2.66	4.60	7.10	1.07	1.96	0	0	0	19.86
1871–72	.50	.31	4.03	16.64	11.52	19.78	5.34	.66	.12	.04	0	0.20	59.14
1872–73	0	.36	5.20	7.24	3.55	6.92	2.91	1.13	.04	.30	0.10	0	27.75
1873–74	.05	.34	4.98	15.50	12.94	5.46	7.26	3.72	1.16	.26	.01	0	51.68
1874–75	0	5.61	12.99	2.27	9.83	1.06	1.76	.59	2.32	0	0	0	36.43
10-year mean	------	------	------	------	------	------	------	------	------	------	------	------	42.02

[a] Year incomplete.

Record of precipitation at Alturas, Modoc County.

[Latitude, 41° 30′; longitude, 120° 30′; elevation, 4,300 feet. Authority, J. H. Stewart.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1901–2	------	0.83	0.74	1.21	0.01	------	------	------	------	------	------	------	2.79

Record of precipitation at Fort Bidwell, Modoc County.

[Latitude, 41° 53′; longitude, 120° 11′; elevation, 4,640 feet. Authority, U. S. War Department.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1866–67	0	1.00	3.50	5.80	12.00	4.80	6.70	1.30	0	0.60	0.10	1.40	37.20
1867–68	2.80	.80	3.10	8.20	3.50	.40	4.00	.60	2.40	4.10	.35	0	30.25
1868–69	.20	.10	.80	.90	2.50	.40	2.36	1.55	.70	.20	.70	0	10.41
1869–70	.45	0	2.37	2.30	12.71	5.40	3.21	1.41	2.87	1.36	.76	.05	32.89
1870–71	0	.03	2.29	9.10	1.23	3.26	3.21	0	.97	.16	.38	.02	20.65
1871–72	.20	.20	.79	3.25	1.16	3.97	1.32	.77	1.82	.06	0	.26	13.80
1872–73	1.18	.46	1.69	1.94	2.22	1.66	.60	2.06	.78	.10	.14	.21	13.04
1873–74	.40	.63	1.14	3.29	1.51	1.08	1.05	1.12	.64	1.06	.05	.27	12.24
1874–75	0	.99	2.74	.13	2.10	.07	2.15	.45	1.30	1.00	0	.05	10.98
1875–76	0	1.80	2.62	1.54	3.57	.32	.80	.53	.98	.43	0	0	12.59
1876–77	0	1.99	4.32	2.05	9.36	3.30	4.10	2.14	4.66	2.10	.10	.35	34.47
1877–78	.10	.80	3.03	.35	.75	4.65	2.35	1.05	.82	.20	.25	.37	14.72
1878–79	.70	.30	.25	.20	3.90	2.63	.95	1.00	1.40	.15	.15	.30	11.93
1879–80	.10	1.34	1.75	6.60	3.10	3.80	3.36	5.60	1.38	.26	.72	.42	28.43
1880–81	.05	.50	.56	6.09	10.00	6.00	1.50	3.02	.84	1.59	.32	.10	30.57
1881–82	.24	3.55	2.87	3.40	3.44	2.82	1.46	1.72	.64	.38	.16	0	20.68
1882–83	.48	2.73	.92	1.77	2.52	.64	.77	1.56	1.30	0	0	0	12.69
1883–84	0	1.18	1.14	1.06	1.14	2.96	.72	.68	.40	4.29	.67	.08	14.32
1884–85	1.40	.73	T.	6.81	2.09	1.82	.04	3.45	1.99	1.05	1.38	.17	20.93
1885–86	.09	.75	8.46	3.74	5.78	2.16	1.48	2.20	1.44	.78	.41	.04	27.33
1886–87	0	1.36	1.06	4.25	3.31	4.85	.97	1.96	1.47	.73	.18	.21	20.35
1887–88	.05	0	.38	2.40	3.28	1.81	3.28	.16	1.50	2.38	.34	.04	15.62
1888–89	.33	.20	2.03	3.28	2.81	.20	7.31	1.08	1.62	.78	0	0	19.64
1889–90	0	3.61	2.20	3.78	7.45	3.97	3.97	.92	1.07	.33	.05	.05	27.40
1890–91	1.60	.10	0	1.00	.50	3.98	3.83	1.39	1.57	2.73	1.55	.19	18.44
1891–92	.13	.19	1.57	2.76	.79	1.20	.69	2.28	1.57	1.46	.15	.02	12.81
1892–93	.91	1.28	3.12	2.64	2.60	2.92	1.60	1.88	1.66	.01	.50	.05	19.17
27-year mean	------	------	------	------	------	------	------	------	------	------	------	------	20.13

Record of precipitation at Jolon, Monterey County.

[Latitude, 36° 00′; longitude, 121° 15′; elevation, 960 feet. Authority, F. T. Tidball.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1882–83	0.50	0.25	2.05	2.75	1.25	0.85	5.05	0.75	2.45	0	0	0	15.90
1883–84	0	.60	0	1.00	5.75	7.56	9.02	3.35	.50	0.60	0	0.25	28.63
1884–85	0	2.60	.60	4.09	2.31	T.	T.	2.15	0	0	0	0	11.75
1885–86	0	.10	13.15	2.42	8.51	.86	2.37	4.01	0	0	0	0	31.42
1886–87	0	.35	.48	.61	.57	8.52	.38	1.11	.40	T.	0	0	12.42
1887–88	.21	.21	.94	4.42	5.64	.16	4.81	0	.37	.01	T.	0	16.77
1888–89	.60	0	5.64	4.48	1.23	1.40	9.65	.59	1.12	0	0	0	24.74
1889–90	0	7.38	4.09	11.42	6.58	4.59	2.50	05	.30	0	0	.03	36.94
1890–91	.90	0	.57	2.25	.55	8.75	.99	.94	.02	T.	(.00)	(.00)	14.97
1891–92	T.	(.14)	.03	2.99	.84	1.78	2.31	.32	2.25	T.	0	0	10.66
1892–93	0	.23	6.40	6.61	3.83	3.29	5.30	1.35	.22	0	0	0	27.23
1893–94	0	T.	.15	2.31	1.48	.68	.46	.22	1.35	.52	0.05	.05	7.27
1894–95	1.20	.75	.30	8.30	6.16	.32	1.68	.85	.02	0	0	0	19.58
1 95–96	.03	1.80	.96	.50	8.14	.03	2.61	3.62	.09	0	.10	.08	17.96
1 96–97	.03	.75	3.20	2.11	4.61	2.50	3.54	0	0	.08	0	.03	16.85
1 97–98	.15	.43	.12	.46	.85	2.10	.60	.07	.52	T.	0	0	5.30
1898–99	.30	.16	.24	.40	4.55	.13	4.31	1.74	.17	T.	0	0	12.00
1899–1900	0	2.10	1.50	2.30	3.03	.11	1.00	.68	1.18	0	T.	0	11.90
1900–1901	0	2.00	7.53	.53	4.84	6.21	2.58	2.10	.33	0	T.	0	26.12
1901–2	.05	1.16	1.69	0	.99	6.49	3.03	1.28	.08	0	0	0	14.77
20-year mean													18.16

Record of precipitation at Matthews Ranch, near King City, Monterey County.

[Latitude, 36° 15′; longitude, 121° 00′; elevation, 333 feet. Authority, J. L. Matthews.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1901–2			1.37	0.10	0.71	3.74	2.38	0.81					9.11

Record of precipitation at Priests Valley, Monterey County.

[Latitude, 36° 12′; longitude, 120° 45′; elevation, 2,250 feet. Authority, A. J. Myers and Mrs. Martin Griffin, Soledad.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total
1898–99	0.13	0.17	0.36	0.34	4.01	0	5.30	1.33	0.52	0	0	0	12.16
1899–1900	0	3.61	1.82	2.81	2.53	0.16	2.37	1.17	1.23	0	0	0	15.70
1900–1901	0	2.50	7.98	.64	6.27	9.51	.80	2.44	1.59	0	0	0	31.13
1901–2	0	2.57	2.08	.66	.70	5.42	3.60	1.84	.24	0	0	0	17.11
4-year mean													19.18

Record of precipitation at Salinas City, Monterey County.

[Latitude, 36° 41′; longitude, 121° 36′; elevation, 45 feet. Authority, Dr. E. K. Abbott.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1871–72	------	------	------	------	------	------	------	------	------	------	0	0	a0
1872–73	0.01	0	0	6.80	3.40	2.40	0.80	0	0	0	0	0	13.41
1873–74	.10	0.10	0.20	4.25	3.42	0	2.15	0.95	0	0	0	0	11.17
1874–75	0	1.83	1.42	0	4.50	.15	.69	0	0	0	0	0	8.59
1875–76	0	0	5.17	1.98	6.16	3.55	4.52	0	0.01	0	0.10	0	21.49
1876–77	.05	1.04	.05	0	2.54	.16	.30	.10	.40	0	0	0	4.64
1877–78	0	.12	1.00	2.39	7.05	8.77	2.57	1.93	0	0	0	0	23.83
1878–79	.05	.60	.20	.35	2.42	2.81	1.85	1.69	.82	0.15	0	0	10.94
1879–80	0	1.05	1.08	2.28	1.65	1.16	1.64	3.90	.46	0	0	0	13.22
1880–81	0	0	.57	5.56	3.32	2.32	1.26	.66	0	.38	0	0	14.07
1881–82	.10	.28	.67	1.24	1.78	2.31	4.86	1.01	.49	.19	0	0	12.93
1882–83	.38	1.43	.65	1.95	.91	.95	2.26	1.28	1.98	0	0	0	11.79
1883–84	.19	1.19	.25	.90	1.71	4.49	5.09	3.05	.72	2.66	0	0.18	20.43
1884–85	.11	1.79	.28	4.46	1.09	.05	.19	1.21	.12	0	0	0	9.30
1885–86	.02	.08	6.60	1.30	5.10	1.47	2.16	3.83	0	0	0	0	20.56
1886–87	0	.62	.82	.72	.75	4.73	.54	1.63	.07	0	0	0	9.88
1887–88	.71	0	.98	2.16	4.15	.53	3.28	0	.89	0	0	0	12.70
1888–89	.56	0	1.64	2.20	.64	1.65	3.31	.95	.68	0	0	0	11.63
1889–90	0	4.20	2.41	8.90	5.99	3.05	1.79	.60	.65	0	0	0	27.59
1890–91	0	.29	.44	2.05	.59	4.40	.43	2.53	.33	0	0	0	11.06
1891–92	.12	.17	.30	4.66	.44	1.57	2.78	.85	.65	0	0	0	11.54
1892–93	.08	.66	4.09	2.13	1.07	2.91	5.14	.91	0	0	0	0	16.99
1893–94	0	.33	.66	1.59	5.17	3.36	.82	.53	1.57	.26	0	0	14.20
1894–95	1.16	.87	.41	5.35	5.10	1.41	2.07	.94	.45	0	0	0	17.76
1895–96	0	.56	.79	.83	5.65	.22	1.68	2.64	.45	0	0	.42	13.24
1896–97	.02	1.01	3.08	2.02	.66	3.34	4.51	.11	.06	.12	0	0	14.93
1897–98	.56	.78	.97	.96	.96	1.66	1.06	.23	1.22	.10	0	0	8.50
1898–99	.17	.38	.34	1.18	2.98	.50	4.11	.75	.14	0	0	0	10.55
1899–1900	0	2.65	2.96	1.80	.84	.77	1.00	1.41	.25	0	0	0	11.68
1900–1901	0	.69	5.65	.71	1.69	5.44	.50	1.48	.35	0	0	0	16.51
1901–2	.38	.50	1.27	.20	1.01	3.50	2.58	.87	.27	0	0	0	10.58
30-year mean	------	------	------	------	------	------	------	------	------	------	------	------	13.86

a Year incomplete.

Record of precipitation at San Ardo, Monterey County.

[Latitude, 36° 09′; longitude, 121° 10′; elevation, 452 feet. Authority, Pacific Railway System.]

Year.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1886–87	0	0	0 35	0.17	0.58	5.58	0.17	0.76	0.05	0.26	0	0	7.92
1887–88	0.14	0.37	.32	2.07	3.44	.28	2.91	.11	.27	0	0	0	9.91
1888–89	0	0	3.24	2.31	.83	.80	6.16	.49	.27	0	0	0	14.10
1889–90	0	4.74	2.96	7.16	3.36	3.59	.99	0	.43	0	0	0.04	23.27
1890–91	1.10	0	.11	1.41	.43	3.99	.76	1.04	.03	0	0	0	8.87
1891–92	.14	0	0	1.57	.58	.48	1.37	.08	1.61	0	0	0	5.83
1892–93	0	.15	1.80	3.40	1.55	1.31	3.94	.62	.15	0	0	0	12.92
1893–94	0	0	.21	1.06	1.18	.34	.13	.10	.68	.15	0	0	3.85
1894–95	.65	.25	.02	4.42	3.98	.23	.94	.41	.02	0	0	0	10.92
1895–96	0	1.48	2.86	.30	5.10	0	2.11	2.27	.25	0	0	.22	14.59
1896–97	0	.45	2.73	1.54	.89	1.18	2.19	.06	0	0	0	.02	9.06
1897–98	0	.78	.05	.42	.38	.89	.70	0	.43	0	0	T.	3.65
1898–99	T.	.15	.20	.15	3.24	.03	2.81	.84	T.	T.	0	T.	7.40
1899–1900	0	1.65	.96	1.09	1.68	.15	1.15	.39	.66	T.	T.	0	7.73
1900–1901	T.	.88	4.30	.08	3.89	4.17	.51	.67	1.20	0	0	0	15.70
1901–2	.05	.94	1.49	0	.66	4.29	2.20	.74	T.	0	0	0	10.37
16-year mean	------	------	------	------	------	------	------	------	------	------	------	------	10.38

Record of precipitation at Boca, Nevada County.

[Latitude, 39° 24′; longitude, 120° 06′; elevation, 5,531 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869-70	------	------	------	------	------	3.85	1.82	0.81	0.55	0.26	0.12	0	a7.41
1870-71	0	0.80	0.04	1.10	2.50	2.32	1.60	.45	0	.10	2.00	0	10.91
1871-72	0	0	.60	7.30	3.00	.90	10	1.50	10	0	0	0	13.50
1872-73	0	0	.20	2.60	1.80	4.10	.10	.10	.75	0	0	0	9.65
1873-74	0	0	0	4.30	4.70	2.40	6.20	.80	.60	0	.60	0	19.60
1874-75	.10	2.15	3.70	.60	6.30	.0	.65	.60	0	.40	T.	0	14.50
1875-76	0	T.	1.56	1.65	8.10	3.60	4.72	.70	.10	0	.22	0.01	20.66
1876-77	.01	.25	.02	0	5.22	0	.46	.95	.36	.10	0	0	7.37
1877-78	0	0	1.50	.30	3.94	6.74	.86	1.30	0	.13	.08	0	14.85
1878-79	.17	.99	1.60	0	5.47	2.92	4.80	2.08	.45	0	0	0	18.48
1879-80	0	.20	.98	4.18	0	3.00	2.90	6.95	.75	0	0	0	18.96
1880-81	0	0	0	3.74	0	0	.12	0	0	0	0	0	3.86
1881-82	.14	.10	1.20	1.00	3.90	3.60	10.20	1.00	0	0	0	0	21.14
1882-83	0	.80	.90	.60	1.15	2.20	1.70	.90	1.80	0	0	0	10.05
1883-84	.14	2.45	.50	.60	4.60	6.30	5.10	1.90	.30	1.40	0	0	23.29
1884-85	T.	.80	0	8.20	1.00	.10	.10	1.50	0	.30	0	0	12.00
1885-86	0	0	2.40	2.98	8.35	.85	4.40	1.30	.50	0	.15	0	20.93
1886-87	.10	.70	.70	.70	2.40	12.70	0	1.80	T.	.26	.15	T.	19.51
1887-88	0	0	.30	3.74	4.18	1.00	2.40	.10	.51	.10	.15	.30	12.92
1888-89	.12	0	.95	1.45	4.18	3.63	1.15	.10	3.90	0	0	0	15.48
1889-90	.14	1.50	4.55	19.85	14.60	5.40	5.45	1.50	.70	.26	0	0	53.95
1890-91	0	.70	0	3.65	1.25	11.80	2.50	1.70	.84	.26	.15	0	22.85
1891-92	.60	0	.25	8.30	.70	3.35	1.70	2.70	3.10	.70	0	0	21.40
1892-93	0	1.50	8.35	6.95	4.55	8.90	4.00	1.90	1.35	0	0	.05	37.55
1893-94	.55	.25	2.42	3.70	5.10	7.55	.75	1.00	.33	T	0	T	21.65
1894-95	T.	.61	.50	11.80	8.36	1.20	.45	.70	.90	T	0	T.	24.52
1895-96	.97	.11	.01	1.52	7.75	.50	6.30	6.65	3.10	.25	1.15	.18	28.49
1896-97	.35	0	2.47	1.80	2.20	6.35	8.35	10	.50	.40	0	.50	23.02
1897-98	T	2.10	2.80	2.72	1.55	2.90	2.50	1.30	.85	1.00	0	0	17.72
1898-99	.01	1.28	1.84	1.58	6.80	1.85	7.95	.85	2.40	.10	0	.98	25.64
1899-1900	0	4.42	2.59	4.53	1.57	.60	3.52	4.27	1.10	2.67	T.	1.22	26.49
1900-1901	.66	3.04	5.73	4.58	7.17	6.76	2.24	2.04	1.86	0	0	.08	34.16
1901-2	.40	.80	1.15	3.77	1.30	2.50	2.70	T.	T.	0	.10	6	12.72
32-year mean	------	------	------	------	------	------	------	------	------	------	------	------	19.33

a Year incomplete.

Record of precipitation at Bowman's dam, Nevada County.

[Latitude, 39° 27′; longitude, 120° 39′; elevation, 5,400 feet. Authority, H. C. Perkins and W. H. Radford.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1871-72	0	0.98	7.88	38.20	12.98	27.08	7.52	4.57	1.09	1.04	0.88	0	102.22
1872-73	0.25	.73	5.43	17.41	5.73	16.17	3.82	3.20	2.65	0	.06	0	55.45
1873-74	0	1.24	4.37	23.47	21.53	9.98	17.73	5.47	3.93	.45	0	0.08	88.25
1874-75	0	4.54	15.35	1.58	16.91	.25	5.18	.83	2.85	2.38	.25	0	50.12
1875-76	0	3.09	23.43	10.77	17.62	11.70	18.01	5.92	.99	.36	1.28	0	93.17
1876-77	.41	10.76	.53	0	14.33	3.18	7.49	3.17	3.33	1.17	0	0	44.37
1877-78	0	1.52	8.26	1.71	17.00	21.21	10.07	2.57	2.06	.10	.09	.13	64.72
1878-79	0	2.83	5.36	1.30	14.50	14.28	20.97	9.57	3.93	.71	.05	.10	73.60
1879-80	0	3.41	9.62	15.00	9.27	8.17	9.51	31.72	8.90	0	0	0	95.60
1880-81	0	0	.65	25.05	27.82	15.08	7.29	4.44	1.22	0	0	0	81.55
1881-82	2.33	6.09	4.25	10.78	11.46	7.47	15.17	7.96	1.16	0	0	0	66.67
1882-83	2.94	11.47	6.51	4.32	5.06	5.28	12.79	5.15	0	0	0	0	53.52
1883-84	2.45	5.03	2.46	5.20	13.50	19.45	18.02	12.44	2.01	3.53	0	0	84.09
1884-85	1.08	3.04	0	46.57	4.49	3.74	.80	6.41	1.57	2.64	0	0	70.34
1885-86	1.26	0	24.96	8.66	17.84	2.99	7.24	13.22	3.20	0	0	0	79.37
1886-87	0	2.25	1.76	6.95	7.46	21.60	2.27	5.81	1.93	.76	0	0	50.79
1887-88	0	0	1.25	8.97	.....	.....	.....	.....	.....	.....	.....	.....	[a]10.22
1894-95	.....	.....	.....	.....	.....	8.77	9.65	.....	9.15	0	T.	.37	[a]27.94
1895-96	10.12	.45	2.81	11.20	29.85	1.92	14.95	18.45	8.98	.11	.09	1.00	99.93
1896-97	2.05	2.83	19.40	10.31	4.88	18.31	18.91	2.85	.92	4.04	0	T.	84.50
1897-98	.61	4.74	5.35	5.31	3.01	12.23	2.63	2.10	3.95	2.12	0	0	42.05
1898-99	.55	2.64	7.51	3.22	14.11	2.54	26.31	1.73	4.80	1.04	0	1.15	65.60
1899-1900	0	16.27	12.53	15.72	9.60	4.44	10.77	6.62	2.67	.40	.02	0	79.04
1900-1901	1.38	12.98	11.47	8.15	14.30	18.79	4.67	5.99	1.73	T.	T.	.05	79.51
1901-2	4.12	4.28	7.54	8.01	2.40	21.08	9.26	5.96	2.76	.46	.09	T.	65.96
23-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72.63

[a] Year incomplete.

Record of precipitation at Grass Valley, Nevada County.

[Latitude, 39° 13′; longitude, 121° 4′; elevation, 2,090 feet. Authority, Mr. Lontzenhuser and B. F. Berriman.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1872–73	0	0	0	13.13	4.01	12.52	1.39	2.32	2.56	0	0	0	35.93
1873–74	0	0.83	2.99	19.01	13.71	6.93	11.71	3.76	1.05	0.10	0	0	60.09
1874–75	0	2.95	15.91	1.08	15.56	1.39	4.14	.29	1.18	2.28	0	0	44.78
1875–76	0	.97	16.99	7.44	12.01	10.75	12.47	2.80	1.23	0	.65	0	65.31
1876–77	0.06	8.72	.62	0	10.18	2.44	4.79	1.14	1.40	.74	0	0	30.09
1877–78	0	1.21	3.78	1.74	15.74	17.76	10.18	2.78	.59	0	0	0	53.78
1878–79	.68	2.09	2.54	.75	10.72	11.51	18.07	7.08	3.08	.30	0	0.08	56.90
1879–80	0	2.79	6.54	8.86	6.40	4.83	4.07	2.33	6.23	.09	0	0	42.14
1880–81	0	.04	.30	22.69	19.20	8.50	3.33	1.85	.05	1.50	0	0	57.46
1881–82	1.25	3.71	3.52	8.21	6.03	6.30	7.96	5.27	1.18	0	0	0	43.43
1882–83	1.88	7.88	4.78	2.83	3.05	2.97	9.25	2.38	5.77	0	0	0	40.79
1883–84	1.44	3.03	1.48	2.31	7.80	10.27	13.98	10.98	1.00	2.30	0	0	54.59
1884–85	.98	3.30	.05	28.39	3.65	1.76	.83	3.17	.16	.90	0	0	43.19
1885–86	2.65	0	19.27	6.36	12.40	1.43	4.83	11.38	1.09	0	0	0	59.41
1886–87	0	1.66	.67	5.46	3.38	15.72	1.69	6.54	.64	.52	0	0	36.28
1887–88	.26	0	1.38	6.85	11.81	2.59	5.22	.50	.38	2.26	.08	0	31.33
1888–89	.55	0	4.29	8.70	.64	1.08	12.95	3.87	7.21	.40	0	0	39.69
1889–90	0	12.49	8.76	21.08	18.64	10.02	13.69	3.52	3.10	.02	0	0	91.32
1890–91	1.95	0	0	5.51	1.54	13.70	6.22	2.98	2.06	1.27	.90	0	36.13
1891–92	.21	1.00	1.76	10.26	4.70	7.15	6.61	6.37	6.49	0	0	0	44.55
1892–93	.23	2.72	13.44	11.22	7.31	6.83	12.40	5.80	1.30	0	T.	0	61.25
1893–94	1.64	1.49	8.77	5.55	11.24	11.72	2.96	1.67	3.46	2.05	T.	.03	50.58
1894–95	1.01	4.91	1.38	16.55	22.26	6.18	5.01	3.38	3.46	0	.25	.24	64.63
1895–96	3.87	.02	1.17	7.27	20.34	.93	6.94	12.47	4.87	.13	.02	.13	58.16
1896–97	1.53	1.72	13.65	5.78	3.65	14.40	8.47	2.25	.10	.62	.04	.03	52.24
1897–98	.51	3.07	4.56	3.97	1.44	8.36	.52	(.90)	2.53	1.27	T.	T.	27.13
1898–99	.61	2.08	4.31	2.73	10.76	.47	19.60	1.70	2.72	.83	0	.42	46.23
1899–1900	0	10.33	11.58	11.35	6.90	2.54	7.40	3.92	1.31	.65	.04	.03	56.05
28-year mean													49.41

Record of precipitation at Malakoff mine, Nevada County.

[Latitude, 39° 22′; longitude, 120° 50′; elevation, 3,200 feet. Authority, R. D. Wheeler.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1886–87	0	2.39	0.80	5.32	5.06	18.12	2.27	7.52	0.89	0.49	0	0	42.86
1887–88	0.64	0	1.68	8.26	12.14	2.67							[a]25.39
1894–95					24.40	7.28	7.01	5.18	6.03	0	0.14	0.41	[a]50.45
1895–96	6.22	.56	2.27	7.36	24.11	1.36	10.20	17.78	6.61	T.	.06	.15	76.68
1896–97	1.90	2.33	17.42	7.02									[a]28.67
2-year mean													59.77

[a] Year incomplete.

Record of precipitation at Nevada City, Nevada County.

[Latitude, 39° 16′; longitude, 121° 2′; elevation, 2,500 feet. Authority, J. S. Brown.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1863–64	0	0	1.00	3.50	0.90	0.50	5.38	3.25	2.75	0	0	0.75	18.03
1864–65	0	0	17.05	17.42	9.71	4.38	2.09	1.75	1.31	0	0	0	53.71
1865–66	0.59	2.03	14.29	1.95	15.47	5.60	14.24	.59	4.50	0	0	0	59.26
1866–67	0	0	9.61	32.70	14.21	10.00	6.23	6.88	1.93	0	0	0	81.56
1867–68	1.91	3.63	16.11	41.95	11.01	6.36	23.30	7.22	1.50	2.27	0	0	115.26
1868–69	.34	.43	1.49	10.62	16.85	12.62	6.96	5.72	1.62	.04	0	0	56.69
1869–70	.15	.50	4.67	6.29	9.23	14.48	7.58	4.70	.65	.36	0.03	0	48.64
1870–71	0	3.82	4.32	5.32	11.08	6.26	5.41	5.55	3.26	.33	0	0	45.35
1871–72	0	.79	5.00	27.31	18.16	16.67	5.28	3.76	.17	1.08	0	0	78.22
1872–73	0	.55	4.05	12.25	2.82	12.40	1.96	2.47	2.20	0	0	0	38.70
1873–74	0	.67	1.35	24.27	11.16	7.32	12.20	4.51	1.32	.11	0	0	62.91
1874–75	0	3.06	15.08	.90	16.57	2.11	3.97	.27	1.56	2.43	0	0	45.95
1875–76	0	1.75	16.56	5.90	12.47	12.41	13.88	2.17	1.53	0	0	0	66.67
1876–77	.41	9.85	1.04	0	10.26	2.45	4.18	1.43	1.97	.72	.71	0	33.02
1877–78	0	1.35	4.31	2.65	17.62	16.61	10.05	2.80	1.05	0	0	0	56.44
1878–79	.69	2.32	2.88	.96	11.62	10.97	19.28	5.90	3.83	.43	0	.05	58.93
1879–80	0	3.15	5.50	8.76	6.67	5.48	5.09	22.54	5.58	.15	0	0	62.92
1880–81	0	.06	.28	24.78	18.88	6.26	4.44	1.70	0	1.47	0	0	57.87
1881–82	1.38	3.03	2.53	9.14	7.29	5.42	9.21	4.39	.52	0	0	0	42.91
1882–83	2.22	7.65	5.34	3.87	2.39	3.06	14.27	2.98	6.92	0	0	0	48.70
1883–84	1.28	3.60	1.62	2.84	9.08	12.01	14.70	12.07	1.67	2.47	.07	0	61.41
1884–85	1.87	3.61	0	27.92	4.39	1.69	.53	3.23	.21	1.36	0	0	44.81
1885–86	1.62	0	21.55	6.77	13.66	1.54	6.92	12.49	1.23	0	0	.07	65.85
1886–87	------	------	------	------	3.51	12.64	4.80	7.24	.70	.37	0	0	[a]29.26
1887–88	.71	0	1.70	7.53	11.32	3.52	7.14	.68	.42	2.40	0	0	35.42
1888–89	.06	0	4.69	8.44	T	2.59	14.68	5.20	7.62	.58	.08	0	43.94
1889–90	0	13.05	8.55	24.50	24.05	10.07	13.40	3.11	3.35	.01	0	0	100.09
1890–91	2.04	.04	.04	6.38	2.18	18.66	3.64	2.93	1.92	.73	0	0	38.56
1891–92	.04	.90	1.42	9.56	6.48	6.04	7.27	7.17	5.80	.20	0	T.	44.88
1892–93	.26	.95	13.87	14.19	8.02	8.29	12.75	6.22	1.33	0	T.	0	65.88
1893–94	1.71	1.25	7.78	5.23	11.71	10.85	3.26	2.17	3.54	1.85	0	T.	49.35
1894–95	1.21	4.83	1.38	20.61	22.87	5.53	5.12	3.82	3.42	0	.15	.29	69.23
1895–96	3.36	0	1.87	6.14	19.61	.99	7.39	13.63	4.88	T.	.05	.05	57.97
1896–97	1.55	2.18	12.63	6.46	4.38	13.63	9.13	2.08	.22	.82	0	T.	53.08
1897–98	.60	3.36	4.38	3.17	1.92	9.91	.87	.95	2.73	1.27	0	T.	29.16
1898–99	.37	1.96	3.49	2.27	9.12	.49	15.88	1.52	2.61	.91	0	.29	38.91
1899–1900	0	10.24	10.85	10.27	7.81	2.36	7.51	4.83	1.90	.03	T.	0	55.80
1900–1901	.55	5.52	9.22	4.00	11.52	13.12	2.35	5.59	1.29	0	T.	.04	53.20
1901–2	3.36	4.16	5.45	5.35	1.91	18.28	5.02	4.66	1.47	.24	0	0	49.90
38-year mean	------	------	------	------	------	------	------	------	------	------	------	------	54.98

[a] Year incomplete.

NOTE.—Record from January, 1887, to February, 1892, inclusive, from J. F. Colley.

Record of precipitation at North Bloomfield, Nevada County.

[Latitude, 39° 22′; longitude, 120° 54′; elevation, 3,160 feet. Authority, H. C. Perkins and W. H. Radford.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1870-71	0	1.61	3.24	4.31	7.54	5.94	5.03	4.36	3.36	0.12	0	0	35.51
1871-72	0	.83	6.20	25.19	12.71	18.22	5.73	3.84	1.39	.41	0	0	74.52
1872-73	0.16	.53	4.47	11.77	4.16	11.09	2.50	2.40	1.57	0	0.10	0	38.75
1873-74	0	.67	3.37	19.00	15.17	7.08	11.16	4.04	1.78	.25	0	0.02	62.54
1874-75	.06	4.88	13.52	1.21	.15	.88	3.56	.30	2.68	.63	0	0	27.87
1875-76	0	2.09	15.53	7.64	10.98	10.20	13.02	4.03	1.06	.01	1.76	.01	66.33
1876-77	.31	10.46	.85	0	9.98	2.89	4.92	3.07	2.66	.91	0	0	36.05
1877-78	0	1.10	4.22	1.96	15.72	16.97	9.23	2.44	.95	0	0	0	52.59
1878-79	0	3.34	3.72	1.18	10.00	9.49	16.62	6.69	3.84	.64	0	.24	55.76
1879-80	0	3.03	6.43	13.57	5.96	5.66	5.45	23.31	5.63	0	0	0	69.04
1880-81	0	0	.41	21.10	19.46	12.13	4.92	2.59	1.33	1.57	0	0	63.51
1881-82	1.75	3.86	4.05	8.73	8.02	6.77	10.02	5.39	1.82	0	0	0	50.41
1882-83	2.74	6.86	5.72	3.59	3.69	3.94	10.45	3.39	0	0	0	0	40.38
1883-84	1.79	3.66	1.48	2.84	9.21	10.02	15.65	10.31	2.66	4.03	0	0	61.65
1884-85	1.98	3.43	0	37.21	3.65	1.91	.79	3.62	.71	2.14	0	0	55.44
1885-86	2.55	0	20.23	7.98	13.49	1.78	2.18	12.26	1.15	0	0	0	61.62
1896-97	1.90	2.33	17.42	7.02	5.06	16.57	11.16	3.70	.20	1.45	0	.11	66.92
1897-98	.57	5.05	6.12	5.41	2.28	13.03	.79	1.18	4.47	1.70	T	T	40.60
1898-99	.58	2.87	5.66	4.10	10.88	1.01	18.24	1.98	3.91	.65	0	.67	50.55
1899-1900	0	14.52	13.33	13.09	9.32	5.20	9.64	6.82	2.44	T	.01	0	74.37
1900-1901	.95	8.32	10.99	4.95	7.73	13.46	2.97	6.27	1.73	0	T	T.	57.37
1901-2	4.51	3.98	4.68	5.87	1.60	18.04	6.40	5.29	1.70	.19	.09	.04	52.39
22-year mean													54.28

Record of precipitation at Truckee, Nevada County.

[Latitude, 39° 19′; longitude, 120° 01′; elevation, 5,820 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869–70	------	------	------	------	------	6.18	4.35	0.12	2.40	0.80	1.30	------	[a]15.15
1870–71	0	0	0.51	1.67	4.80	4.23	3.18	2.00	.28	.35	0	0	17.02
1871–72	0.20	0.02	5.35	16.23	3.42	10.49	3.63	4.11	.60	.30	0	0	44.35
1872–73	0	.40	.60	3.74	3.78	9.55	1.69	1.36	.55	0	T.	0	21.67
1873–74	0	.11	.42	8.70	9.54	6.15	9.35	2.61	.68	.11	.56	0.07	38.30
1874–75	.04	2.44	3.54	.60	8.50	.20	1.20	.90	0	1.81	.40	.03	19.66
1875–76	T.	.62	8.94	4.90	9.85	5.50	6.95	1.83	.84	.01	.05	.03	39.52
1876–77	.03	3.64	.07	.05	9.45	.39	1.84	1.03	1.12	.36	0	0	17.98
1877–78	.04	0	1.66	.24	5.97	11.80	2.07	.80	1.17	.10	0	.28	24.13
1878–79	.23	.75	2.14	.50	7.70	2.68	5.25	1.55	.45	0	0	0	21.25
1879–80	.07	1.40	3.78	4.98	2.95	4.65	4.65	12.74	2.50	0	.16	0	37.88
1880–81	0	0	.45	9.51	5.71	2.13	1.86	.49	.40	1.26	.18	0	21.99
1881–82	.25	2.50	2.70	3.80	6.40	4.95	12.05	1.89	.85	.98	.60	0	36.97
1882–83	0	.85	1.04	.80	1.55	3.05	1.65	2.19	1.13	0	.53	0	12.79
1883–84	.28	2.46	2.50	1.62	6.65	11.20	5.38	3.90	.14	1.02	0	.10	35.25
1884–85	.78	1.50	0	13.14	1.80	.54	.56	2.04	.08	0	0	.25	20.69
1885–86	.47	0	6.95	2.22	7.08	.50	2.90	1.78	.60	.56	.89	0	23.95
1886–87	T.	.85	1.10	2.29	3.43	12.25	.36	2.00	2.04	.37	.40	T.	25.09
1887–88	0	0	.30	4.80	2.35	0	0	T.	.70	.80	.72	.20	9.87
1888–89	.28	0	2.38	1.58	.80	1.40	2.51	1.01	4.51	0	0	0	14.47
1889–90	0	3.13	3.29	2.51	16.20	8.90	7.29	.45	1.44	0	0	.22	43.43
1890–91	.80	.45	0	3.70	1.22	8.36	3.92	2.17	2.90	.46	0	0	23.98
1891–92	.98	.05	.45	6.34	2.65	2.80	3.00	2.96	4.20	.95	0	0	24.38
1892–93	.29	.37	5.73	8.15	5.44	8.02	5.18	3.73	1.79	0	0	0	38.70
1893–94	1.22	.35	3.96	2.82	8.06	10.95	2.65	2.15	1.05	T.	0	0	33.21
1894–95	.13	1.12	.60	13.95	11.13	1.92	1.72	.50	2.40	0	0	0	33.47
1895–96	1.32	.34	.50	2.96	7.07	.40	4.67	9.36	.54	0	.15	.34	27.65
1896–97	.32	.40	3.86	2.50	2.35	7.97	2.84	.30	T.	.18	0	0	20.72
1897–98	T.	.55	3.20	3.15	1.05	3.65	2.05	.25	.30	0	0	0	14.20
1898–99	.40	.06	2.95	1.50	7.80	2.70	9.50	1.10	.75	0	0	.92	27.68
1899–1900	0	6.49	2.80	1.80	2.63	.80	4.20	1.90	.80	1.01	0	0	22.43
1900–1901	0	1.02	2.50	2.70	5.00	7.97	2.50	1.80	.70	0	0	0	24.19
1901–2	.50	2.78	3.63	1.55	1.10	3.30	5.60	1.28	.55	0	.45	1.10	21.84
32-year mean	------	------	------	------	------	------	------	------	------	------	------	------	26.21

[a] Year incomplete.

Note.—During July, 1902, there was also 3 feet of snow at Truckee.

Record of precipitation at Alta, Placer County.

[Latitude, 39° 13′; longitude, 120° 49′; elevation, 3,612 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869–70	------	------	------	------	------	13.75	6.56	3.73	1.32	0.66	------	------	[a]26.02
1870–71	0	0	2.75	3.94	5.21	5.45	7.00	3.50	1.50	0	0	0	29.35
1871–72	0	0	T.	6.50	11.25	13.85	.45	.38	0	0	0	0	32.43
1872–73	0	0.25	.19	6.50	1.65	10.00	.95	3.03	0	0	0	0	22.57
1873–74	0.40	0	.90	15.59	12.66	7.17	3.76	5.75	1.27	0	0	0	47.50
1874–75	0	3.92	12.86	.09	13.17	.01	3.40	.40	.12	2.00	0	0	35.97
1875–76	0	.02	18.52	8 30	7.70	4.72	9.08	1.07	1.80	0	0.02	0	51.23
1876–77	0	7.00	.70	0	10.00	2.35	6.10	2.60	2.61	.80	0	0	32.16
1877–78	0	1.70	3.90	1.00	9.10	14.80	11.65	2.50	.33	0	0	0	44.98
1878–79	.60	2.96	4.18	1.00	12.80	13.10	24.30	7.73	2.45	0	0	0	69.12
1879–80	0	1.50	9.53	10.02	2.70	4.90	3.10	11.60	2.90	0	0	0	46.25
1880–81	0	0	1.00	13.80	21.00	11.80	3.50	.50	0	0	0	0	51.60
1881–82	1.12	4.50	5.60	13.60	5.93	6.40	15.40	3.20	1.15	.80	0	0	57.70
1882–83	2.70	7.65	5.64	2.31	4.08	1.60	9.06	3.43	6.07	0	0	0	42.54
1883–84	.60	1.60	2.05	3.10	3.50	8.60	7.00	5.20	.50	3.00	0	0	35.15
1884–85	.12	1.00	0	14.08	1.50	.60	.10	2.48	0	1.00	(b)	------	[a]20.88
14-year mean	------	------	------	------	------	------	------	------	------	------	------	------	42.75

[a] Year incomplete. [b] Alta ceased reporting after June, 1885.

Record of precipitation at Auburn, Placer County.

[Latitude, 38° 53′; longitude, 121° 05′; elevation, 1,363 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869–70	------	------	------	------	------	7.31	3.92	2.63	0.45	0.81	0	0	[a]15.12
1870–71	0	0	0	0.46	7.21	2.36	1.85	3.57	2.06	0	0	0	17.51
1871–72	0	0.54	2.80	13.55	6.80	9.35	3.59	2.50	.65	.22	0	0	40.00
1872–73	0	.38	3.13	8.43	3.74	7.44	.53	1.22	.32	0	0	0	25.19
1873–74	0	.34	1.25	11.97	7.46	4.14	6.26	2.56	.57	0	0	0	34.55
1874–75	0	1.57	9.64	.82	10.00	.44	2.73	.10	.61	1.82	0	0	27.73
1875–76	0	.85	11.39	6.05	7.56	5.62	10.10	1.97	.61	0	0.41	0.21	44.77
1876–77	0	4.52	.65	0	6.94	1.47	2.14	.72	1.53	.27	0	0	18.24
1877–78	0	.99	2.46	1.55	10.61	10.19	7.60	1.75	.98	0	0	0	36.13
1878–79	0.50	.89	1.53	.91	6.34	7.16	8.78	5.94	2.43	.46	0	0	34.94
1879–80	0	2.33	3.82	7.88	3.13	4.90	2.62	13.02	3.85	0	0	0	41.55
1880–81	0	0	.25	13.91	9.61	8.20	2.43	1.38	0	1.40	0	0	37.18
1881–82	.92	2.72	3.01	5.87	4.60	4.99	6.05	4.63	.53	.28	0	0	33.60
1882–83	.84	5.19	4.08	1.65	2.86	1.06	5.19	.70	4.07	0	0	0	25.64
1883–84	1.70	2.51	1.00	2.52	5.33	7.63	10.17	8.02	.85	1.23	0	0	40.96
1884–85	.56	2.25	0	16.37	1.74	1.27	.57	2.10	0	.70	0	0	25.56
1885–86	.64	0	15.24	4.05	8.25	0	4.10	9.38	.65	0	0	0	42.31
1886–87	0	.89	1.26	4.88	2.04	12.38	1.50	4.34	.30	0	0	T.	27.59
1887–88	1.09	0	1.22	4.90	7.07	1.40	3.25	.80	.40	1.55	0	(T.)	21.68
1888–89	.30	0	4.20	5.82	.33	.52	9.57	1.36	4.65	0	0	0	26.75
1889–90	0	5.75	4.85	11.94	8.97	3.96	8.08	2.83	2.30	0	0	0	48.68
1890–91	2.63	.14	0	5.13	.88	6.80	5.40	2.23	.88	.69	0	0	24.78
1891–92	0	1.33	.95	7.36	4.00	4.91	5.96	3.11	4.55	0	0	0	32.17
1892–93	.15	1.76	6.13	8.99	5.33	4.74	9.20	3.71	.78	0	0	0	40.79
1893–94	.70	1.11	5.32	3.88	6.96	9.89	1.95	1.35	2.77	1.38	T.	T.	35.31
1894–95	.67	3.87	7.09	13.56	12.99	4.14	3.09	3.38	1.88	0	T.	.13	50.80
1895–96	2.04	.12	1.04	3.39	11.88	.49	6.21	7.66	2.42	.43	.14	.25	36.07
1896–97	------	------	------	------	2.78	11.40	8.05	1.51	.28	.17	0	T.	[a]24.19
1897–98	.20	2.83	2.22	3.50	1.13	6.44	.32	.49	2.26	.97	T.	0	20.36
1898–99	.26	1.75	3.59	2.75	4.78	.17	13.25	.51	1.28	1.43	0	.03	29.80
1899–1900	0	5.94	9.00	5.47	5.47	2.11	3.69	3.42	2.19	T.	0	0	37.29
1900–1901	.45	4.50	6.38	2.01	7.82	8.84	1.25	4.83	.88	0	T.	0	36.96
1901–02	2.39	5.71	4.86	3.95	1.70	12.72	4.80	3.10	.80	.50	T.	.02	40.55
31-year mean	------	------	------	------	------	------	------	------	------	------	------	------	33.40

[a] Year incomplete.

Record of precipitation at Cisco, Placer County.

[Latitude, 39° 19′; longitude, 120° 33′; elevation, 5,939 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869–70	------	------	------	------	------	13.46	3.70	0.65	0.40	------	------	0	[a]18.21
1870–71	0	1.20	2.80	4.40	6.40	8.40	2.40	3.05	4.95	0.85	0	0	34.45
1871–72	0.40	.20	6.20	24.89	6.50	12.55	3.98	6.05	1.14	1.03	0.53	T.	63.47
1872–73	0	.60	2.65	9.51	5.60	14.00	1.60	1.60	1.50	0	0	0	37.06
1873–74	0	.55	1.35	14.40	7.70	7.00	14.00	4.10	3.10	0	0	0	52.20
1874–75	.50	2.70	7.07	.50	8.40	.45	4.80	.90	.82	2.05	0	0	28.19
1875–76	0	1.75	8.55	5.30	18.50	22.20	17.20	.70	1.20	T.	0	0	75.40
1876–77	0	2.48	4.20	0	7.20	.30	.53	2.87	3.71	.80	0	0	22.09
1877–78	0	.60	4.52	1.30	9.60	11.85	2.00	2.00	4.00	0	0	0	35.87
1878–79	.20	1.45	1.85	1.25	9.30	10.34	16.42	5.50	2.90	.30	.03	0.04	49.58
1879–80	0	2.10	8.17	8.92	4.80	7.10	7.60	11.90	3.90	.03	0	0	54.52
1880–81	.01	.82	.62	16.33	33.46	12.91	6.10	4.81	0	3.30	0	0	78.36
1881–82	2.16	2.93	3.60	8.76	11.71	8.50	25.30	5.60	.91	.48	0	0	69.95
1882–83	.83	8.28	3.75	2.88	.90	4.85	9.25	3.50	6.96	0	0	0	41.20
1883–84	0	1.50	2.20	2.70	8.40	12.00	14.65	10.10	0	3.45	0	0	55.00
1884–85	1.40	2.32	0	25.05	2.30	1.28	2.20	3.95	.30	.95	0	0	39.75
1885–86	.50	0	17.05	4.87	14.75	2.40	7.40	7.50	1.45	0	0	0	55.92
1886–87	0	1.45	1.05	6.10	4.90	22.85	.80	3.95	.40	0	T.	0	41.50
1887–88	.15	0	1.60	8.80	9.75	2.72	6.10	2.20	1.50	1.20	0	0	34.02
1888–89	.68	.15	5.38	9.88	1.40	9.97	2.70	1.65	8.10	.47	0	0	40.38
1889–90	0	11.72	9.54	25.57	22.90	14.90	8.70	1.50	2.50	.30	0	0	97.63
1890–91	3.11	.55	0	7.90	2.20	11.88	6.45	3.70	2.25	3.75	.20	0	41.99
1891–92	.21	1.00	1.76	2.83	5.10	7.61	8.55	6.30	8.30	1.40	0	0	43.06
1892–93	.30	.95	12.60	11.20	3.20	8.50	7.78	0	1.60	T.	0	0	46.13
1893–94	0	0	5.38	8.80	16.45	18.65	5.30	3.55	2.60	0	0	0	60.73
1894–95	.10	.90	1.50	21.60	------	------	------	------	------	------	------	------	[a]24.10
1895–96	------	------	------	------	------	------	------	------	------	------	------	------	------
1896–97	------	------	------	------	3.90	10.20	15.20	7.00	------	------	------	0	[a]36.30
1897–98	.49	2.48	14.00	.50	3.80	5.60	1.30	9.00	3.40	1.10	0	0	42.67
1898–99	.83	2.10	4.80	1.10	10.70	2.60	19.56	1.30	2.10	2.10	0	.50	47.69
1899–1900	0	12.83	13.47	12.14	8.40	6.43	9.56	4.85	1.53	.60	.15	0	70.96
1900–1901	.33	7.57	10.43	7.50	10.95	22.45	4.70	4.40	3.25	0	0	0	71.58
1901–02	2.41	3.27	5.38	8.80	1.54	14.17	5.40	1.80	.90	.40	T.	T.	44.07
29-year mean	------	------	------	------	------	------	------	------	------	------	------	------	50.88

[a] Year incomplete.

Record of precipitation at Colfax, Placer County.

[Latitude, 39° 08'; longitude, 120° 57'; elevation, 2,421 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869–70	------	------	------	------	------	5.55	5.41	3.19	0.25	------	0	0	[a]14.40
1870–71	0	1.21	2.58	3.94	7.24	4.85	4.30	4.03	2.55	0.13	0	0	30.83
1871–72	0	0	4.25	9.80	10.02	13.68	4.69	3.40	.61	.40	0	T.	46.85
1872–73	T.	0	3.99	10.48	2.90	11.12	1.24	1.81	2.04	0	T.	0	33.58
1873–74	0	0	2.27	18.84	10.93	6.62	10.12	3.53	1.31	0	0	0	53.62
1874–75	0	3.36	13.89	1.12	12.32	.19	3.23	.20	1.90	0	0	0	36.21
1875–76	0	.95	14.84	7.10	10.40	7.20	14.39	3.23	1.42	T.	0	0	59.53
1876–77	0	7.98	.62	0	9.29	1.76	4.36	1.36	1.67	.57	0	T.	27.61
1877–78	0	.95	3.38	1.76	13.10	12.21	9.22	1.79	.42	T.	0	0	42.83
1878–79	0.56	0	2.08	.85	8.73	8.87	14.62	6.57	2.91	.27	0	0	45.46
1879–80	0	2.94	4.68	9.16	4.53	6.60	2.85	21.09	4.29	0	0	0	56.14
1880–81	0	T.	0	16.47	15.59	9.30	3.83	1.53	T.	1.31	0	0	48.03
1881–82	1.63	1.38	3.40	8.01	9.09	7.11	6.97	3.98	1.13	.13	0	0	42.83
1882–83	.40	2.96	4.03	3.60	1.68	3.23	7.98	2.93	5.92	0	0	0	32.73
1883–84	1.08	2.97	1.34	2.32	7.57	9.73	12.27	10.94	1.38	3.01	0	0	52.61
1884–85	.80	2.55	T.	23.60	2.85	1.66	.68	2.29	0	1.18	0	0	35.61
1885–86	.62	0	15.48	6.77	12.17	.34	3.69	10.86	1.08	0	0	0	51.01
1886–87	0	1.96	.46	6.12	2.99	9.24	1.51	4.92	.72	0	0	0	27.92
1887–88	.68	.84	1.61	6.00	13.28	2.18	2.80	.95	.17	2.69	0	0	31.20
1888–89	.25	.10	3.28	9.57	.50	.90	13.90	3.00	9.14	.25	0	0	40.89
1889–90	0	9.95	9.60	21.85	17.90	8.00	14.70	3.95	3.85	0	0	0	89.80
1890–91	2.75	T.	0	4.54	1.95	14.60	9.60	2.45	1.70	2.60	0.90	0	40.89
1891–92	0	.40	1.06	11.04	4.85	7.55	7.45	5.73	6.14	.60	0	0	44.82
1892–93	.53	2.20	1.55	16.95	7.62	5.68	12.80	4.22	1.30	0	0	0	52.85
1893–94	.85	1.23	9.32	5.08	13.43	9.76	3.60	4.48	3.45	2.45	0	0.03	54.08
1894–95	1.00	5.75	0	24.17	20.57	5.55	4.76	0	4.80	0	0	.28	66.88
1895–96	2.29	0	1.77	8.85	23.23	.93	6.36	16.15	5.39	0	0	.10	65.07
1896–97	1.64	1.62	14.39	5.58	4.15	15.86	7.46	0	0	.85	0	0	51.55
1897–98	T.	3.86	3.28	5.80	1.80	9.61	1.89	1.38	2.98	1.50	0	0	32.10
1898–99	.36	1.42	4.46	3.01	9.29	.87	20.73	1.16	2.41	1.72	0	.30	45.73
1899–1900	0	9.63	13.06	12.83	6.41	4.38	7.79	5.74	3.12	.10	0	0	63.06
1900–1901	1.00	7.33	12.27	3.96	13.91	15.75	2.65	6.55	1.91	0	0	0	65.33
1901–02	2.95	4.45	4.82	5.45	.98	18.14	7.11	4.84	.90	.70	0	.02	50.36
32-year mean	------	------	------	------	------	------	------	------	------	------	------	------	47.44

[a] Year incomplete.

Record of precipitation at Emigrant Gap, Placer County.

[Latitude, 39° 17′; longitude, 120° 40′; elevation, 5,230 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869–70	.....	.....	.....	.....	.....	.....	6.39	3.16	0.46	0.04	0	0	a 10.05
1870–71	0	1.63	3.00	6.30	5.75	7.15	2.75	2.80	3.34	.41	0	0	33.13
1871–72	.....	.....	.....	.....	.....	14.58	6.08	4.44	.27	0	0	0	a 25.37
1872–73	0	.50	.20	15.65	6.30	18.50	2.70	1.58	3.34	0	0.01	0	48.78
1873–74	0	1.25	2.70	17.30	10.02	10.42	22.12	.50	.63	.63	0	0	65.57
1874–75	0	2.00	1.00	.40	5.85	.20	2.90	1.00	2.50	1.50	0	0	17.35
1875–76	0	0	9.10	3.90	14.80	5.70	7.30	2.70	1.50	.80	.30	0	46.10
1876–77	0	1.75	.60	0	4.30	.05	.50	.50	1.20	.83	T.	0	9.73
1877–78	0	.32	5.44	1.62	15.72	16.87	7.17	3.87	.53	0	0	0	51.54
1878–79	.65	2.25	3.04	.75	15.43	13.21	21.69	7.76	2.81	.34	0	0	67.93
1879–80	0	3.30	5.11	12.33	10.10	9.88	9.75	21.76	3.42	.06	0	0	75.71
1880–81	0	0	.30	15.38	25.69	5.42	5.49	4.63	.37	2.54	0	0	59.82
1881–82	1.70	6.68	2.90	5.64	10.03	9.46	16.60	2.60	1.55	.49	0	0	57.50
1882–83	.60	7.95	2.15	3.31	3.22	4.00	10.06	3.30	4.90	0	0	0	39.49
1883–84	1.25	3.66	1.20	3.15	8.22	10.20	15.18	10.84	2.10	2.77	0	0	58.57
1884–85	.91	1.93	0	31.20	2.68	2.15	.40	3.89	.20	1.83	0	0	45.19
1885–86	.53	0	18.69	7.38	18.28	1.97	6.90	11.90	2.73	T.	0	0	68.38
1886–87	0	2.96	.40	8.00	4.12	18.80	2.03	6.17	1.02	1.14	0	0.13	44.77
1887–88	.05	3.00	1.50	7.70	17.05	3.92	5.42	3.30	2.23	3.04	.62	0	47.83
1888–89	.10	0	1.77	7.39	1.10	1.10	5.69	2.29	8.61	.38	0	0	28.43
1889–90	0	11.81	11.41	20.85	16.90	9.80	13.15	1.72	3.37	0	0	0	89.01
1890–91	.32	.65	0	6.20	1.70	7.88	4.55	3.15	2.70	2.40	0	0	29.55
1891–92	0	.20	2.40	12.90	5.42	7.46	5.70	3.00	5.60	.70	0	0	43.38
1892–93	.10	1.70	15.02	19.97	5.50	6.38	10.05	5.71	.69	0	0	0	65.12
1893–94	1.20	2.00	5.95	9.19	10.10	15.50	18.00	2.62	1.60	2.29	0	0	68.45
1894–95	0	2.41	.90	9.19	17.90	1.40	.50	1.60	1.20	0	0	0	35.10
1895–96	.31	2.41	1.90	4.00	17.40	7.88	8.00	11.50	1.20	.30	T.	0	54.90
1896–97	.....	.....	.....	.....	2.70	2.96	12.80	1.40	T.	.....	.....	0	a 19.86
1897–98	.....	.....	5.56	.....	.....	.....	1.20	1.10	.....	.....	.....	.....	a 7.86
25-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.05

a Year incomplete.

Record of precipitation at Iowa Hill (Strawberry Flat), Placer County.

[Latitude, 39° 07′; longitude, 120° 49′; elevation, 2,825 feet. Authority, C. F. Macy.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1878–79	------	------	------	------	12.50	12.50	18.25	7.87	3.25	0.25	0	0	[a]54.62
1879–80	0	3.50	3.63	13.35	5.90	6.10	7.88	18.87	6.25	0	0	0	64.58
1880–81	0	.75	.75	20.80	20.75	10.50	4.62	3.15	.13	2.12	0	0	63.57
1881–82	2.50	4.25	3.90	10.56	8.92	6.80	10.43	7.59	1.55	.73	0	0	57.23
1882–83	.35	8.50	6.63	2.69	4.37	4.24	10.63	3.67	7.22	0	0	0	48.30
1883–84	.75	4.54	2.02	3.75	8.05	11.26	16.50	13.22	1.60	2.52	0	0	64.21
1884–85	1.60	2.43	0	24.22	3.03	1.48	.68	2.93	.05	1.60	0	0	38.02
1885–86	1.20	0	15.82	6.14	10.89	.68	6.46	12.19	1.87	0	0	T.	55.25
1886–87	0	2.28	.80	5.75	3.61	15.61	2.23	6.55	.78	0	0	0.05	37.66
1887–88	.48	0	.95	6.52	11.73	2.41	4.59	1.47	1.14	2.60	0.06	T.	31.95
1888–89	.35	0	3.78	8.14	.58	.71	12.12	4.20	8.26	.22	.05	.06	38.47
1889–90	0	9.20	8.49	21.04	20.87	10.74	14.12	3.02	3.48	.08	0	T.	91.04
1890–91	2.29	.35	0	7.34	1.96	10.52	8.28	3.55	2.03	2.13	.83	0	39.28
1891–92	.30	.98	1.51	11.64	4.01	5.36	7.11	6.02	6.57	.41	0	0	43.91
1892–93	.51	2.51	8.21	11.88	6.91	5.80	12.94	6.69	1.44	0	T.	0	56.89
1893–94	1.81	1.35	8.30	5.37	11.07	12.25	4.20	2.10	4.03	1.64	T.	.51	52.63
1894–95	.78	4.06	1.48	17.57	18.64	5.57	4.60	3.93	3.92	0	.03	.27	60.85
1895–96	2.91	.17	1.61	5.87	17.77	.70	10.93	14.01	4.58	0	.11	.06	58.72
1896–97	1.00	.49	13.42	5.13	3.44	15.83	11.33	2.15	.15	1.32	0	0	54.26
1897–98	.45	3.09	3.49	5.31	2.04	8.10	1.68	.99	2.83	1.49	T.	0	29.47
1898–99	.44	1.87	4.03	2.84	6.93	.83	18.06	1.15	2.41	1.15	0	.32	40.03
1899–1900	0	9.18	9.08	8.15	4.43	3.39	6.40	4.59	2.59	.10	.05	0	47.96
1900–1901	.99	5.67	9.65	3.16	9.94	12.61	1.98	6.55	.96	0	T.	.07	51.58
1901–2	4.12	3.98	4.72	6.08	1.15	15.75	7.54	3.90	1.04	.66	0	.15	49.09
23-year mean	------	------	------	------	------	------	------	------	------	------	------	------	51.08

[a] Year incomplete.

Record of precipitation at Summit, Placer County.

[Latitude, 39° 19′; longitude, 120° 27′; elevation, 7,017 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1870–71	0	0.24	3.22	5.11	8.44	8.39	3.38	2.77	0.31	0.89	0	0	32.75
1871–72	0.33	.40	9.33	28.88	4.44	17.61	6.55	6.22	.33	0	0	0	74.09
1872–73	0	0	0	7.10	2.56	18.00	6.72	2.72	1.52	0	0	0	38.62
1873–74	0	0	0	12.68	5.00	0	0	2.22	3.33	.11	0	0	23.34
1874–75	0	3.80	2.63	.94	8.65	13.89	5.22	.89	1.58	2.64	0	0	40.24
1875–76	0	0	7.22	7.78	16.28	9.67	15.33	3.33	1.11	0	0	0	60.72
1876–77	.56	8.18	.53	.22	17.89	.64	3.82	.31	4.03	.02	1.26	0.10	37.56
1877–78	.30	.59	3.69	2.50	14.11	13.58	3.38	2.67	1.61	0	0	.09	42.52
1878–79	.44	1.35	.89	1.66	11.51	9.33	23.37	5.02	2.83	.11	0	0	56.51
1879–80	0	1.55	6.22	17.00	7.33	8.33	9.99	33.71	3.86	0	0	0	87.99
1880–81	0	0	.55	6.89	8.00	4.67	1.67	1.11	.05	.52	0	0	23.46
1881–82	.60	3.38	3.40	9.52	8.01	10.00	10.33	3.61	.66	0	0	0	49.51
1882–83	.75	13.26	4.39	5.50	1.11	2.88	8.50	3.77	3.66	0	0	0	43.82
1883–84	.10	1.06	1.33	3.55	8.44	14.11	10.11	14.00	.82	4.10	0	0	57.62
1884–85	1.10	3.13	0	9.40	1.40	.58	.10	4.88	1.00	.80	0	T.	22.39
1885–86	.05	0	13.60	3.00	13.90	1.40	7.80	6.40	.95	0	0	0	47.10
1886–87	0	3.10	1.70	5.75	6.25	20.70	1.40	5.80	.95	1.60	.10	T.	47.35
1887–88	T.	.07	1.50	11.60	9.20	1.29	8.05	2.30	1.04	3.72	3.50	.28	42.55
1888–89	0	0	1.90	5.26	1.00	1.50	9.55	1.90	6.30	.22	0	0	27.63
1889–90	0	5.65	6.80	18.50	19.20	11.60	14.00	0	.80	0	0	0	76.55
1890–91	0	0	0	7.40	1.50	1.38	5.10	4.60	1.10	0	0	0	21.08
1891–92	1.20	.05	.30	11.90	4.00	3.40	7.40	4.50	6.30	.20	0	0	38.25
1892–93	0	.60	8.80	9.50	7.90	10.80	14.50	9.20	0	0	0	0	61.30
1893–94	0	.30	0	6.00	15.50	15.25	3.40	4.30	2.40	0	0	0	47.15
1894–95	.95	1.28	.53	9.53	25.80	4.20	4.70	2.50	2.40	0	0	0	51.89
1895–96	.20	0	1.40	8.30	10.50	.70	9.70	18.20	5.40	0	.21	.02	54.63
1896–97	.40	.90	12.30	4.10	4.05	14.35	18.00	1.25	0	.70	0	0	56.05
1897–98	.03	2.50	26.50	4.20	4.00	7.10	5.20	.80	2.90	.90	0	0	54.13
1898–99	0	4.40	2.50	3.60	12.70	5.20	15.75	1.75	3.60	.70	0	1.00	51.20
1899–1900	0	16.05	9.15	7.90	5.25	4.75	8.15	4.80	3.97	.50	.25	T.	60.77
1900–1901	.95	3.50	6.90	3.50	11.30	14.20	4.50	5.50	1.00	0	0	0	51.35
1901–2	1.40	4.20	4.70	2.80	4.00	16.30	8.90	3.00	1.10	.30	0	1.00	47.70
32-year mean													47.74

Record of precipitation at Towles, Placer County.

[Latitude, 39° 18′; longitude, 120° 38′; elevation, 3,704 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1885–86	0.80	0	14.40	7.00	9.80	0.50	5.10	3.80	0	0	0	0	41.40
1886–87	0	0.80	.80	3.00	4.35	11.60	1.10	1.20	T.	0	T.	0	22.85
1887–88	0	0	.90	1.06	20.14	1.71	0	0	0	1.06	0.08	0	24.95
1888–89	0	1.11	1.08	1.01	.45	.90	.60	0	0	0	0	0	5.15
1889–90	0	6.03	4.11	11.40	19.40	14.60	3.00	0	1.00	0	1.00	0	60.54
1890–91	.10	1.02	8.10	8.03	1.81	14.65	10.52	2.59	2.86	2.52	1.40	0	53.60
1891–92	1.08	1.72	2.23	11.18	4.95	7.16	9.32	7.78	8.10	.75	0	0	54.27
1892–93	.93	2.74	12.54	17.33	9.06	8.65	16.61	7.98	2.34	0	0	0	78.18
1893–94	2.75	1.76	10.62	6.78	13.76	10.10	5.39	2.42	2.06	2.15	0	0	57.79
1894–95	1.20	5.60	1.60	13.88	19.05	7.24	4.60	5.15	4.76	0	0	0	63.08
1895–96	4.25	.80	2.16	7.61	21.34	1.08	14.03	15.66	7.21	0	T.	0	74.14
1896–97	8.04	1.08	3.12	6.07	5.25	13.34	5.48	2.48	.30	1.30	0	0	46.46
1897–98	.10	1.78	9.29	4.61	2.95	8.29	.50	.50	3.18	2.09	0	0	33.29
1898–99	.48	2.85	5.35	3.36	8.54	.90	19.51	1.48	2.49	1.60	0	1.14	47.70
1899–1900	0	9.08	10.90	10.64	8.04	19.06	3.07	1.02	.10	0	0	0	61.91
1900–1901	.10	8.16	18.06	11.60	5.99	14.16	6.08	0	1.10	0	0	0	65.25
1901–2	20.01	1.10	19.10	15.91	1.75	22.25	1.11	.50	1.52	0	0	0	82.25
17-year mean													51.54

Record of precipitation at Laporte, Plumas County.

[Latitude, 39° 41′; longitude, 120° 59′: elevation, 5,000 feet. Authority, Weather Bureau.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94								3.05	2.00	3.49	T.	0.17	[a]8.71
1894–95	1.13	8.87	1.32	15.47	22.01	6.65	6.12	4.00	8.55	0	1.41	.29	75.82
1895–96	8.42	.69	3.35	9.98	32.43	2.84	16.20	16.63	9.32	.09	.31	.25	100.51
1896–97	2.29	3.09	23.87	12.88	6.04	17.92	13.51	3.12	0.71	3.94	0	T.	87.37
1897–98	1.26	4.84	9.34	6.63	2.53	13.04	1.62	1.49	4.64	2.73	T.	.04	48.16
1898–99	0.94	3.31	6.67	3.36	12.95	2.96	25.26	2.92	4.43	1.48	0	.82	64.83
1899–1900	0	18.30	15.96	16.23	11.95	5.66	12.24	6.51	2.57	.36	.06	T.	89.84
1900–1901	.61	13.02	14.30	8.79	17.25	18.35	6.24	7.48	2.09	T.	T.	.05	88.18
1901–2	5.26	4.82	9.10	8.16	2.64	33.50	10.09	9.59	2.28	.64	.02	T.	86.10
8-year mean													80.10

[a] Year incomplete.

Record of precipitation at Mumford Hill, Plumas County.

[Latitude, 39° 53′; longitude, 121° 05′; elevation, 4,750 feet. Authority, J. A. Edman, Meadow Valley.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1876–77	------	------	------	------	11.40	5.00	5.13	2.50	3.00	1.72	0.52	0	[a]29.27
1877–78	0	1.10	3.05	2.10	18.15	26.52	9.44	2.10	1.85	0	.30	0.70	65.31
1878–79	2.10	2.75	5.15	3.75	12.38	12.62	30.15	6.53	3.60	1.13	0	.29	80.45
1879–80	0	4.01	7.20	14.16	10.06	7.96	5.18	23.54	6.42	0	0	.90	79.43
1880–81	0	0	.76	24.34	16.57	13.28	3.60	3.21	.84	.54	0	0	63.14
1881–82	1.36	3.28	4.32	11.23	9.94	8.60	10.75	7.48	2.05	0	0	0	59.01
1886–87	------	------	------	------	------	------	------	------	------	------	------	------	44.20
1889–90	1.50	18.77	10.83	29.40	31.33	18.44	20.25	6.33	2.00	0	0	0	138.85
1890–91	1.50	.75	1.10	8.18	2.00	22.65	7.90	3.17	2.39	1.95	1.25	0	52.84
1891–92	.50	1.50	2.06	13.60	5.45	5.12	5.40	6.35	6.03	0	0	0	46.01
1892–93	.32	2.61	22.70	24.98	11.47	13.07	13.89	8.43	3.23	.16	0	0	100.86
1893–94	1.79	1.27	9.46	4.40	17.46	16.48	7.08	3.94	2.85	2.26	0	1.45	68.44
1894–95	1.17	6.54	2.26	24.00	26.11	5.83	10.59	3.80	7.18	0	0	.27	87.75
1895–96	9.35	1.13	3.48	9.22	32.70	1.20	13.33	16.25	7.20	0	.08	.22	94.16
1896–97	1.43	2.53	16.64	11.13	5.44	13.80	12.07	1.59	.06	2.14	0	0	66.83
1897–98	.70	3.78	8.17	5.21	1.73	12.74	1.41	1.25	4.94	2.11	0	0	42.04
1898–99	.26	2.27	4.10	1.94	13.12	3.01	17.04	2.35	2.92	.64	0	1.64	49.29
1899–1900	0	15.38	13.09	11.89	10.99	3.10	8.95	6.24	1.63	.61	0	.05	71.93
1900–1901	.20	12.51	13.13	7.70	16.79	15.36	4.94	5.62	1.34	0	0	.50	78.09
1901–2	4.86	4.27	8.85	6.81	2.38	25.42	10.60	6.77	2.49	0	.13	.02	72.60
19-year mean	------	------	------	------	------	------	------	------	------	------	------	------	71.64

[a] Year incomplete.

Record of precipitation at Banning, Riverside County.

[Latitude, 33° 56′; longitude, 116° 55′; elevation 2,317 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1878–79	0	0	0	1.08	2.37	0.66	0	1.48	0	0	0	0	5.59
1879–80	0	0.02	2.84	4.55	.75	1.59	2.77	2.40	0	0	0	0	14.92
1880–81	0	.52	.87	------	------	------	------	------	------	------	------	------	[a]1.39
1898–99	------	------	------	------	2.70	.72	2.14	.08	0.01	0.48	0	0	[a]6.13
1899–1900	0	.69	2.23	.88	1.29	.05	1.19	2.22	1.80	0	0	0	10.35
1900–1901	0.10	.47	3.94	0	4.12	6.46	.81	.60	1.21	0	0	1.19	18.90
1901–2	0	1.17	.50	0	2.74	4.83	4.63	1.00	.06	T.	0.14	0	15.07
6-year mean	------	------	------	------	------	------	------	------	------	------	------	------	11.82

[a] Year incomplete.

Record of precipitation at Beaumont, Riverside County.

[Latitude, 33° 55′; longitude, 117° 00′; elevation, 2,560 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1887–88	.....	.....	.....	.....	1.39	1.18	5.78	0.87	0.40	0	0	0.50	[a]10.12
1888–89	0	0.30	3.92	4.19	1.15	1.95	5.27	.61	.29	0	0	0	17.68
1889–90	0	1.56	.67	11.03	3.71	4.74	1.13	1.15	1.05	0	0.15	.15	25.40
1890–91	1.04	0	.43	2.74	0	8.70	1.07	1.72	2.43	0	0	.87	19.00
1891–92	.48	0	.23	2.43	.96	3.53	3.18	.37	1.87	0	0	0	13.05
1892–93	0	0	1.65	1.95	2.97	2.66	9.67	.40	0	0	0	.18	19.48
1893–94	0	1.45	0	4.34	.30	2.09	.35	.32	.43	0	0	0	9.28
1894–95	.42	0	0	8.89	11.49	2.28	2.72	1.24	T.	0	0	0	27.04
1895–96	0	.14	1.90	.34	1.68	.65	4.48	0	.82	0	.25	.31	10.57
1896–97	0	2.24	1.05	.30	5.00	5.91	4.60	0	0	0	0	0	19.10
1897–98	0	0	0	.43	1.58	.75	1.95	1.00	3.00	0	0	0	8.71
1898–99	0	0	0	1.20	2.64	1.02	1.40	.35	.10	1.07	0	0	7.78
1899–1900	0	.88	2.85	.89	1.45	0	1.16	2.33	1.72	0	0	0	11.28
1900–1901	.25	.38	3.98	0	4.08	4.77	.35	.35	1.80	0	0	.51	16.47
1901–2	0	1.56	.43	0	2.51	3.59	4.14	1.07	.24	0	.05	0	13.59
14-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15.60

[a] Year incomplete.

Record of precipitation at San Gorgonio Pass, Riverside County.

[Latitude, 33° 54′; longitude, 117° 02′; elevation, 2,560 feet. Authority, J. J. Ring and M. Murray.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1874–75	.....	.....	.....	0.40	1.00	0.60	.....	.....	0	T.	0	0	[a]2.00
1875–76	0.03	0	1.33	1.23	9.31	5.54	6.26	0.99	.20	0	0.03	0.12	25.04
1876–77	.19	.18	0	0	5.55	2.03	3.93	2.59	3.93	0	.30	T.	18.70
1877–78	.03	1.30	.80	4.28	6.03	10.49	4.40	6.81	1.33	0.26	.03	.20	35.96
1878–79	0	0	.97	.92	2.88	1.78	.55	3.23	.01	.62	0	.22	11.18
1879–80	0	1.00	4.10	9.39	1.78	2.81	3.04	6.94	.14	0	T.	.09	29.29
1880–81	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881–82	0	.50	1.33	10.27	2.48	1.86	3.39	3.62	.35	0	.94	0	24.74
1882–83	0	.55	1.33	.42	3.30	7.29	4.38	4.21	.35	1.30	0	.62	23.73
1883–84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1884–85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1885–86	.....	.....	.....	.....	2.97	1.73	3.07	1.24	0	0	0	0	[a]9.01
1886–87	0	0	.58	3.36	.06	5.07	.08	2.94	.14	0	.07	0	12.30
1887–88	0	1.23	1.51	.....	.....	.....	.....	.....	.....	.....	.....	.....	[a]2.74
8-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22.62

[a] Year incomplete.

Record of precipitation at Whitewater, Riverside County.

[Latitude, 33° 54′; longitude, 116° 39′; elevation, 1,123 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1877–78	0	0	0	1.30	1.40	0.98	0.45	2.35	0	0	0	0	6.48
1878–79	0	T.	.18	.46	1.30	.28	.34	.30	0	0	0	0	2.86
1879–80	0	0	1.62	2.08	.51	.42	.20	.12	0.01	0	0	0.25	5.21
1880–81	0	0 15	.34	1.70	0	0	2.25	.01	0	0	0	.46	4.91
1881–82	0	T.	0	0	0	.48	.20	.16	0	0	0	0	.84
1882–83	0	0	.57	0	.15	.34	.80	.55	0	0	0	0	2.41
1883–84	0	.78	0	1.92	1.10	6.96	3.05	0	0	0	0	0	13.81
7-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.22

NOTE.—Whitewater ceased reporting after August, 1884.

Record of precipitation at Sacramento, Sacramento County.

[Latitude, 38° 35′; longitude, 121° 30′; elevation, 71 feet. Authority, Signal Service and Weather Bureau.]

Year.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1849-50	0.25	1.50	2.25	12.50	4.50	0.50	10.00	4.25	0.25	0	0	0	36.00
1850-51	0	0	0	0	.65	.35	1.88	1.14	.69	0	0	0	4.71
1851-52	1.00	.18	2.14	7.07	.58	.12	6.40	.19	.30	0	0	0	17.98
1852-53	0	0	6.00	13.41	3.00	2.00	7.00	3.50	1.45	0	0	0	36.36
1853-54	0	.01	1.50	1.54	3.25	8.50	3.25	1.50	.21	0.31	0	0	20.07
1854-55	0	1.01	.65	1.15	2.67	3.46	4.20	4.32	1.15	.01	0	0	18.62
1855-56	0	0	.75	2.00	4.92	.69	1.40	2.13	1.84	.03	0	0	13.76
1856-57	0	.20	.65	2.40	1.38	4.80	.67	0	0	.35	0.01	0	10.46
1857-58	0	.66	2.41	6.63	2.44	2.46	2.88	1.21	.20	.10	0	0	18.99
1858-59	0	3.01	.15	4.34	.96	3.91	1.64	.98	1.04	0	.03	0	16.06
1859-60	.02	0	6.48	1.83	2.31	.93	5.11	2.87	2.49	.02	.55	0	22.61
1860-61	.06	.91	.18	4.28	2.67	2.92	3.32	.48	.59	.13	0	0	15.54
1861-62	0	0	2.17	8.64	15.04	4.26	2.80	.82	1.81	.01	0	0.01	35.56
1862-63	0	.36	0	2.33	1.73	2.75	2.36	1.69	.35	0	0	0	11.57
1863-64	0	0	1.49	1.82	1.08	.19	1.30	1.08	.74	.09	0	.08	7.87
1864-65	0	.12	6.72	7.87	4.78	.71	.48	1.37	.46	0	0	0	22.51
1865-66	.08	.48	2.43	.36	7.70	2.01	2.02	.48	2.25	.10	.02	0	17.93
1866-67	0	0	2.43	9.51	3.44	7.10	1.01	1.80	.01	0	0	0	25.30
1867-68	.01	0	3.81	12.85	6.04	3.15	4.35	2.31	.27	T.	0	0	32.79
1868-69	0	0	.77	2.61	4.79	3.63	2.94	1.24	.65	.01	0	0	16.64
1869-70	T.	2.12	.85	1.96	1.37	3.24	1.64	2.12	.27	T.	T.	0	13.57
1870-71	0	.02	.58	.97	2.08	1.92	.69	1.45	.76	T.	0	0	8.47
1871-72	T.	.21	1.22	10.59	4.04	4.74	1.94	.61	.28	.02	0	0	23.65
1872-73	T.	.22	1.93	5.39	1.23	4.36	.55	.51	0	T.	.02	T.	14.21
1873-74	0	.31	1.21	10.01	5.20	1.86	3.05	.89	.37	T.	T.	0	22.90
1874-75	.05	2.26	3.80	.44	8.70	.55	.80	T.	T.	1.10	0	0	17.70
1875-76	0	.44	6.20	5.52	4.99	3.75	4.15	1.10	.15	0	.21	.02	26.53
1876-77	T.	3.45	.30	0	2.77	1.04	.56	.19	.64	.01	T.	T.	8.96
1877-78	0	.73	1.07	1.43	9.26	8.04	3.09	1.07	.17	0	0	0	24.86
1878-79	.29	.55	.51	.47	3.18	3.88	4.88	2.66	1.30	.13	T.	T.	17.85
1879-80	0	.88	2.05	3.41	1.64	1.83	1.70	14.20	.76	0	T.	0	26.47
1880-81	0	0	.05	11.81	6.14	5.06	1.37	1.64	T.	.50	T.	0	26.57
1881-82	.30	.55	1.88	3.27	1.89	2.40	3.78	1.99	.35	.10	T.	0	16.51
1882-83	.57	2.63	3.22	1.13	2.23	1.11	3.70	.67	2.85	0	0	0	18.11
1883-84	.90	.97	.61	.44	3.43	4.46	8.14	4.32	.06	1.45	0	T.	24.78
1884-85	.60	2.01	0	10.45	2.16	.49	.08	.68	T.	.11	T.	0	16.58
1885-86	.08	.02	11.34	5.76	7.95	.29	2.68	4.08	.07	0	0	0	32.27
1886-87	0	.68	.21	2.21	1.12	6.28	.94	2.53	T.	0	0	T.	13.97
1887-88	.02	0	.45	2.09	4.81	.57	3.04	.10	.40	.08	T.	T.	11.56
1888-89	.55	0	4.28	4.63	.15	.33	6.25	.26	3.25	.25	0	0	19.95
1889-90	0	6.02	3.15	7.82	6.62	4.06	3.00	1.33	1.80	0	0	T.	33.80
1890-91	.80	T.	0	3.34	.53	6.61	1.78	2.04	.66	.05	T.	0	15.81
1891-92	.10	.10	.48	3.28	1.78	2.84	3.02	1.20	2.38	T.	0	0	15.18
1892-93	.18	.70	6.60	4.90	3.27	2.66	3.51	1.08	1.05	0	T.	T.	23.95
1893-94	.22	.12	2.92	1.76	4.17	3.92	.74	.34	1.70	.46	T.	T.	16.35
1894-95	.88	1.06	.48	8.86	8.42	1.84	1.20	.86	.51	0	.04	T.	24.15
1895-96	1.26	.17	1.54	1.54	9.76	.09	2.57	5.34	.92	0	T.	.20	23.39
1896-97	.31	.55	3.56	1.76	3.66	4.15	2.54	.25	.30	.04	0	.01	17.13
1897-98	.16	1.96	.61	1.64	.98	3.19	.04	.28	1.50	.14	0	0	10.50
1898-99	.36	.64	.61	2.30	3.94	.04	6.02	.10	.54	.49	0	.02	15.06
1899-1900	0	4.46	2.62	2.91	3.54	.32	1.61	1.88	2.88	T.	T.	0	20.22
1900-1901	0	1.74	4.50	1.38	3.70	5.32	.48	2.23	.80	T.	T.	T.	20.15
1901-2	.56	1.56	2.68	1.19	.95	6.52	1.99	1.36	.45	.01	0	T.	17.27
53-year mean													19.62

Record of precipitation at Barstow, San Bernardino County.

[Latitude, 34° 51′; longitude, 116° 59′; elevation, 2,150 feet. Authority, W. L. Burbeck, Geo. R. Gooding, G. W. Fetts, and others.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1888–89	------	------	------	------	0.14	0.04	0.93	0	0.12	0	0	0.13	[a]1.36
1889–90	0.07	0.23	0.70	3.87	.36	.15	T.	.07	0	0	0	.15	5.60
1890–91	.59	0	.05	.52	0	2.47	T.	.05	T.	0	T.	.06	3.74
1891–92	.08	0	T.	.25	------	------	------	------	------	------	------	------	[a].33
1892–93	------	------	------	------	.11	.27	.77	.06	T.	0	1.10	0	[a]2.31
1893–94	0	.22	T.	.72	.02	.21	.06	0	.22	T.	T.	0	1.45
1894–95	0	0	0	.92	1.06	0	.20	0	0	0	0	0	2.18
1895–96	0	.33	T.	0	.16	0	.08	0	0	0	.07	.87	1.51
1896–97	0	1.55	.25	.30	2.15	.65	.11	0	0	T.	0	.18	5.19
6-year mean	------	------	------	------	------	------	------	------	------	------	------	------	3.28
1901–2	------	------	------	------	------	------	0	0	0	0	0	0	[a]0

[a] Year incomplete.

Record of precipitation at Deep Creek, San Bernardino County.

[Latitude, 34° 15′; longitude, 17° .07′; elevation, 5,200 feet. Authority, Arrowhead Reservoir Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94	1.95	1.19	1.20	4.16	1.94	1.89	2.75	0.70	1.01	0.12	0.09	0.80	17.80
1894–95	.49	.30	0	18.41	13.14	2.13	7.21	1.36	0	0	0	0	43.04
1895–96	0	0	2.45	1.09	1.86	.05	3.52	1.75	.28	0	0	.78	11.78
1896–97	0	2.28	1.65	2.41	5.43	13.03	7.59	0	.19	.10	0	0	32.68
1897–98	.28	3.92	1.17	1.40	4.20	1.10	1.89	.17	2.93	.05	.11	.55	17.77
1898–99	0	0	.53	.49	------	------	------	------	------	------	------	------	[a]1.02
1899–1900	------	------	------	------	1.40	.28	3.07	2.70	4.75	------	------	------	[a]12.20
5-year mean	------	------	------	------	------	------	------	------	------	------	------	------	24.61

[a] Year incomplete.

Record of precipitation at Bear Valley dam, San Bernardino County.

[Latitude, 34° 15′; longitude, 116° 58′; elevation, 6,500 feet.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1883–84	------	------	------	------	------	------	------	------	------	------	------	------	94.60
1884–85	------	------	------	------	------	------	------	------	------	------	------	------	28.06
1885–86	------	------	------	------	------	------	------	------	------	------	------	------	65.51
1886–87	------	------	------	------	------	------	------	------	------	------	------	------	24.00
1887–88	------	------	------	------	------	------	------	------	------	------	------	------	62.30
1888–89	------	------	------	------	------	------	------	------	------	------	------	------	46.03
1889–90	------	------	------	------	------	------	------	------	------	------	------	------	93.40
1890–91	------	------	------	------	------	------	------	------	------	------	------	------	78.40
1891–92	------	------	------	------	------	------	------	------	------	------	------	------	38.00
1892–93	------	------	------	------	------	------	------	------	------	------	------	------	44.32
10-year mean	------	------	------	------	------	------	------	------	------	------	------	------	57.46

Record of precipitation at Glen Ranch, San Bernardino County.

[Latitude, 34° 50′; longitude, 117° 30′; elevation, 3,112 feet. Authority, Jas. M. Applewhite, Cajon.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1899–1900	0.10	0.03	0.96	1.00	2.15	0.10	3.84	1.35	1.69	0.02	0.01	0	11.25
1900–1901	.31	.46	9.39	0	6.53	9.78	.43	1.40	.96	0	0	0	29.26
1901–2	0	2.61	.58	.10	1.73	3.67	5.54	.53	0	.24	0	0	15.00
3-year mean													18.50

Record of precipitation at Holcomb Creek, San Bernardino County.

[Latitude, 34° 17′; longitude, 117° 05′; elevation, 5,220 feet. Authority, Arrowhead Reservoir Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1894–95					10.06	0.61	4.86	0.62	0	0	0	0	[a]16.15
1895–96	0	0	1.66	0.41	1.56	T.	3.24	1.02	0.25	0	0	0.47	8.61
1896–97	0	1.70	1.05	1.82	3.35	7.89	3.42	0	.11	0.20	0	0	19.54
1897–98	0.38	3.32	1.09	.90	3.05	.52	1.27	.10	1.46	0	0	.66	12.75
1898–99	0	0	.57	.48									[a]1.05
1899–1900					.38	.21	1.14	1.25	1.20				[a]4.18
3-year mean													13.63

[a] Year incomplete.

Record of precipitation at Little Bear Valley, San Bernardino County.

[Latitude, 34° 15′; longitude, 117° 13′; elevation, 5,150 feet. Authority, Arrowhead Reservoir Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94	1.21	1.49	2.55	7.61	2.48	2.25	3.16	0.62	1.34	0.12	0.04	0.31	23.18
1894–95	.52	.38	0	20.12									[a]21.02
1896–97													
1897–98					3.80	1.38	2.49	.25	4.56		0		[a]12.48
1898–99		T.	.62	.74									[a]1.36
1899–1900					1.39	.43	3.42	3.11	4.63				[a]12.98

[a] Year incomplete.

Record of precipitation at Mill Creek "A," San Bernardino County.

[Latitude, 34° 05′; longitude, 116° 54′; elevation, 5,000 feet. Authority, Redlands Electric Light and Power Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1899–1900					2.52	0.43	2.28	4.49					[a]9.72
1900–1901			9.05		4.32	6.00	.71	.39	1.85	0	0	1.20	[a]23.52
1901–2	0	1.95	.82	0									[a]2.77

[a] Year incomplete.

Record of precipitation at Mill Creek "B," San Bernardino County.

[Latitude. 34° 04′; longitude, 116° 58′; elevation, 2,915 feet. Authority, Redlands Electric Light and Power Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1899–1900	------	------	------	------	1.41	0.07	1.43	3.74	3.31	0	0	0	[a]9.96
1900–1901	1.14	1.15	4.96	0	------	------	------	------	------	------	------	------	[a]7.25

[a] Year incomplete.

Record of precipitation at Morse's house, San Bernardino County.

[Latitude, 34° 12′; longitude, 117° 12′; elevation, 5,350 feet. Authority, Arrowhead Reservoir Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94	0.25	2.44	2.75	14.73	4.78	3.93	5.00	1.37	2.08	0.60	0.02	0.74	38.69
1894–95	.67	.47	0	26.77	18.00	5.85	12.54	2.91	0	0	0	0	67.21
1895–96	0	0	4.18	3.11	5.95	.08	7.90	2.63	.89	0	0	.46	25.20
1896–97	0	3.83	1.96	2.73	9.34	20.14	15.61	.15	.18	.40	0	0	54.34
1897–98	.73	5.08	1.93	1.85	6.37	2.96	4.22	.70	8.27	.25	.08	.30	32.74
1898–99	------	.34	.74	1.28	------	------	------	------	------	------	------	------	[a]2.36
1899–1900	------	------	------	------	2.20	.44	3.83	5.81	8.64	------	------	------	[a]20.92
5-year mean	------	------	------	------	------	------	------	------	------	------	------	------	43.64

[a] Year incomplete.

Record of precipitation at Rancho del Jurupa, San Bernardino County.

[Latitude, 34° 02′; longitude, 117° 27′; elevation, 1,000 feet. Authority, United States post hospital.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1882–83	0	0	2.89	7.50	0.25	0.67	3.15	0.33	1.14	0	0	0.18	16.11
1883–84	0	0	.44	2.04	1.64	2.34	3.09	------	------	------	------	------	[a]9.55

[a] Year incomplete.

Record of precipitation at Redlands, San Bernardino County.

[Latitude, 34° 03′; longitude, 117° 10′; elevation, 1,335 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar	Apr.	May.	June.	July.	Aug.	Total.
1888–89	0	0.05	4.12	4.64	0.68	1.47	5.70	0.99	0.58	0	0	0.28	18.51
1889–90	0.31	1.50	.52	13.72	4.69	3.03	.89	.16	.68	0	0	2.16	27.66
1890–91	.88	.29	0	3.02	0	9.28	1.19	.91	1.10	0.23	0	1.63	18.53
1891–92	.97	0	0	1.51	.87	4.37	2.06	.13	0	0	0	0	9.91
1892–93	.03	0	.46	1.14	2.39	2.65	6.26	.05	0	0	.03	0	13.01
1893–94	.18	1.00	.05	2.59	.67	.90	.59	.31	.62	0	0	.11	7.02
1894–95	.10	.08	0	4.35	6.54	1.12	2.74	0	.45	0	0	0	15.38
1895–96	0	.03	1.17	.33	1.29	.06	2.47	.43	.85	0	0	1.03	7.66
1896–97	0	1.72	2.07	.16	4.33	3.89	1.92	.10	.19	0	0	0	14.38
1897–98	.83	1.92	.07	.51	2.56	.60	.84	.18	1.59	0	0	T.	9.10
1898–99	.01	.01	.25	.40	1.92	.71	1.50	.08	.24	.87	0	.04	6.03
1899–1900	.05	.65	1.28	.46	1.20	T.	.78	2.03	1.41	0	.04	0	7.90
1900–1901	.50	.53	3.88	0	2.25	3.79	.46	T.	1.62	.04	0	0	13.07
1901–2	0	.92	.09	T.	1.64	2.58	2.82	.36	.08	.31	.07	0	8.87
14-year mean	------	------	------	------	------	------	------	------	------	------	------	------	12.64

Record of precipitation at Rings Station, San Bernardino County.

[Latitude, 34° 02′; longitude, 116° 46′; elevation, 4,300 feet. Authority, John J. Ring.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1874–75	0.09	0.61	2.55	0.78	5.64	2.08	0.58	0.37	0	0	0	0	12.70
1875–76	.43	T.	4.06	.25	9.31	5.54	6.23	.99	0.20	0	0.03	0	27.04
1876–77	.19	.18	0	0	5.75	2.33	3.93	2.59	3.93	0	.30	0	19.20
1877–78	0	1.30	0.80	4.03	6.03	10.49	4.41	6.86	1.33	0.26	.03	0.20	35.74
1878–79	0	0	.97	1.52	2.88	5.11	.55	3.23	0	0	0	0	14.26
1879–80	0	1.00	4.10	9.39	1.78	2.81	3.04	1.39	.14	0	0	.09	23.74
1880–81	0	.50	1.05	10.27	2.48	1.86	3.39	2.93	.35	0	.94	0	23.77
1881–82	0	1.30	.08	.42	3.30	7.29	5.38	4.21	.35	1.30	0	0	23.63
8-year mean													22.51

Record of precipitation at Santa Ana Canyon, San Bernardino County.

[Latitude, 34° 09′; longitude, 117° 07′; elevation, 3,000 feet. Authority, Edison Electric Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1899–1900							0.74	5.87					[a]6.61
1900–1901					5.53	7.82	1.10	1.38	1.36				[a]17.19

[a] Year incomplete.

Record of precipitation at Squirrel Inn, San Bernardino County.

[Latitude, 34° 12′; longitude, 117° 15′; elevation, 5,300 feet. Authority, Arrowhead Reservoir Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94	0.38	1.90	5.00	8.93	4.00	3.23	3.54	1.17	1.37	0.23	0	0.62	30.37
1894–95	.50	.34	0	16.38	14.22	5.35	9.58	2.53	0	0	0	0	48.90
1895–96	0	0	2.92	1.98	4.51	0	5.60	.98	.89	0	0	.38	17.26
1896–97	0	3.20	1.60	2.23	7.65	13.31	12.17	.13	3.03	.20	0	0	43.52
1897–98	0	0			4.98	1.95	2.98	.68	6.50		0		[a]17.09
1898–99	.05	.37	.70	1.35									[a]2.47
1899–1900					1.73	.26	3.04	4.81	6.37				[a]16.21
4-year mean													35.01

[a] Year incomplete.

Record of precipitation at Upper Holcomb Valley, San Bernardino County.

[Latitude, 34° 18′; longitude, 116° 55′; elevation, 7,200 feet. Authority, Arrowhead Reservoir Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1897–98					2.60	0.40	1.50	0.50					[a]5.00

[a] Year incomplete.

Record of precipitation at Campo, San Diego County.

[Latitude, 32° 37′; longitude, 116° 30′; elevation, 2,660 feet. Authority, A. Campbell, Campo.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1876–77	------	------	------	------	------	------	2.29	1.08	0.91	0	0.50	0	[a]4.78
1877–78	0	0.35	1.50	2.44	1.79	5.45	1.84	5.75	.41	0	2.32	0.01	21.86
1878–79	0	.31	.55	1.29	2.18	1.32	.60	2.01	0	0	0	0	8.26
1879–80	0	0	3.00	2.23	3.00	2.15	3.56	4.00	0	0	.12	.41	18.47
1880–81	0.01	.68	.85	4.85	1.74	.53	5.00	1.52	.12	0.04	.07	1.27	16.68
1881–82	.02	.73	.11	.24	3.10	4.57	1.01	1.10	.18	.26	.62	.53	12.47
1882–83	.02	------	------	------	------	------	------	------	------	------	------	------	[a].02
1888–89	------	------	------	------	------	4.65	4.00	------	.45	.10	------	2.50	[a]11.70
1889–90	.50	1.10	1.67	9.34	2.40	7.25	1.69	1.86	.90	.16	2.26	2.67	31.80
1890–91	1.80	.44	.95	2.80	0	13.30	.50	1.20	.75	0	0	[b]16.10	37.84
1891–92	0	0	.25	3.21	.75	4.55	3.30	1.25	2.75	.35	0	0	16.41
1892–93	0	.12	.71	.50	3.55	3.65	7.19	1.54	.41	0	0	0	17.67
1893–94	.57	.11	3.38	2.08	5.89	5.83	1.01	.80	4.38	1.26	0	0	25.31
1899–1900	.24	.60	1.61	1.15	2.65	.10	.55	2.07	1.04	.10	0	0	10.11
1900–1901	.05	.28	4.47	0	2.03	8.22	.69	.54	1.18	0	.61	.63	18.70
1901–2	0	1.02	.43	.23	4.28	4.72	4.00	1.33	.07	.12	2.24	0	18.44
13-year mean	------	------	------	------	------	------	------	------	------	------	------	------	19.54

[a] Year incomplete. [b] Cloudburst; rain gage washed away. Record incomplete.

Record of precipitation at Cuyamaca Reservoir, San Diego County.

[Latitude, 33° 00′; longitude, 116° 40′; elevation, 4,800 feet. Authority, San Diego Flume Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1887–88	0	0.78	3.64	6.00	3.35	3.12	4.12	0.21	0	0	0.93	0.04	22.19
1888–89	0.21	3.82	8.33	13.30	2.99	4.70	12.85	3.44	2.22	0	0	1.71	53.57
1889–90	.03	3.82	1.64	20.96	8.05	16.36	4.00	1.02	3.92	0	.09	.90	60.79
1890–91	1.45	.58	3.62	12.14	0	34.70	3.17	3.50	3.69	0	.04	.30	63.19
1891–92	.69	0	.45	6.75	7.23	6.47	7.76	3.35	5.90	0.67	0	0	39.27
1892–93	0	.30	2.87	3.76	5.55	9.13	15.60	1.00	1.00	0	1.20	.30	40.71
1893–94	0	1.90	3.30	2.75	2.05	2.05	0	0	1.00	.50	0	.50	14.05
1894–95	.30	0	0	12.80	28.43	4.60	5.89	1.10	1.16	0	0	0	54.28
1895–96	3.00	1.03	6.01	1.66	5.77	.20	3.01	1.78	.92	0	1.29	.87	25.54
1896–97	1.06	4.93	3.45	3.74	6.32	8.14	8.56	.22	.38	0	0	0	36.80
1897–98	.36	5.09	1.07	2.46	5.47	1.97	4.06	1.24	5.97	0	0	1.32	29.01
1898–99	0	0	.88	.96	7.02	1.53	7.23	.98	.47	2.96	.04	T.	22.07
1899–1900	0	4.51	3.45	2.49	3.62	.26	2.51	6.69	2.81	.10	.28	0	26.72
1900–1901	.92	.74	11.97	.04	8.17	13.26	2.32	1.24	3.87	0	T.	.09	42.62
1901–2	.08	1.94	1.48	.52	8.17	5.70	13.82	2.09	.14	.17	1.54	0	35.65
15-year mean	------	------	------	------	------	------	------	------	------	------	------	------	37.76

Record of precipitation at Descanso, San Diego County.

[Latitude, 32° 50′; longitude, 116° 40′; elevation, 3,500 feet. Authority, E. W. Hulburd, Descanso.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1895–96	T.	0.38	4.37	1.00	2.93	0.10	8.04	1.14	0.17	0	0.30	1.38	19.81
1896–97	0.03	2.71	2.12	2.43	6.48	6.27	5.21	.16	.21	0.01	.62	.04	26.29
1897–98	.56	2.83	.40	2.90	5.28	.89	4.11	.90	2.35	0	.15	.83	21.20
1898–99	0	0	.35	1.00	3.49	1.69	2.73	.25	1.45	0	.15	.38	11.49
1899–1900	0	1.62	.25	1.06	4.00	.75	1.25	4.25	2.69	.06	0	T.	15.93
1900–1901	.25	.63	6.50	.15	3.25	11.00	1.40	.57	1.53	0	T.	.78	26.06
1901–2	T.	1.25	.87	.12	4.47	4.52	8.00	1.50	.06	0	.45	0	21.24
7-year mean	------	------	------	------	------	------	------	------	------	------	------	------	20.29

Record of precipitation at Julian, San Diego County.

[Latitude, 33° 04′; longitude, 116° 36′; elevation, 4,500 feet. Authorities, J. S. Beck and Mrs. S. L. Harritt.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1879–80	0	0	2.13	4.50	1.50	5.75	9.25	7.50	0	0	0	0	30.63
1880–81	0	0	2.25	2.75	5.13	4.88	8.13	2.75	0	0	0	0	25.89
1881–82	0	0	1.88	6.88	5.13	3.38	7.13	4.88	0	0	0	0	29.28
1882–83	0	0	5.13	6.25	10.04	6.63	9.13	4.13	0	0	0	0	41.31
1883–84	0	2.75	0	6.00	2.25	20.63	15.63	10.63	3.63	0	0	0	61.52
1889–90	.....	.....	.....	.....	6.12	10.39	3.63	1.11	2.54	0	0	1.25	[a]25.04
1890–91	1.25	0	2.00	6.36	.07	19.32	2.09	2.66	3.00	0	0	.89	37.64
1891–92	.81	0	2.25	8.61	6.17	6.69	1.54	6.11	3.55	0.41	0	.11	36.25
1892–93	0	.56	1.53	2.81	3.76	3.72	14.42	.66	.62	0	1.65	.41	30.14
1893–94	.03	2.20	3.25	4.00	4.40	2.77	4.19	.32	.68	.04	.17	.34	22.39
1894–95	.21	T.	0	9.38	16.32	3.80	5.04	.95	.45	T.	T.	.70	36.85
1895–96	0	.70	2.60	.75	4.55	.40	6.10	1.40	.10	0	.17	.34	17.11
11-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33.55

[a] Year incomplete.

Record of precipitation at Laguna, San Diego County.

[Latitude, 32° 50′; longitude, 116° 31′; elevation, 5,440 feet. Authority, Arch. Campbell, Campo.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1884–85	.....	.....	.....	.....	.....	.....	.....	2.10	1.36	0.17	0	1.87	[a]5.50
1885–86	.....	0.44	2.71	0.60	.....	.....	.....	.....	.....	0	0.21	2.43	[a]6.39
1886–87	0	.29	1.40	0	.....	.....	.....	.....	.....	.....	.....	.....	[a]1.69
1890–91	.....	.....	.....	.....	.....	.....	.....	.....	.60	0	1.15	2.83	[a]4.58
1894–95	.....	.....	.....	9.97	17.44	2.87	2.70	0	.45	0	0	0	[a]33.43
1895–96	0		6.40		3.55		5.60	1.55	.25	0	1.50	3.83	22.68
1896–97	0	3.35	2.48	2.74	3.60	1.08	.....	.....	.....	.....	.....	.....	[a]13.25
1897–98	0.03	2.50	0	1.80		8.10			4.44	0	0	0	16.87
1898–99	0	0	.....	.....		16.00			0	0	0	0	[a]16.00
1899–1900	0	1.85	2.70	1.65	3.30	.37	1.00	3.80	2.19	.30	0	0	17.16
1900–1901	.20	.40	6.20	0	5.60	8.60	.95	.71	2.09	0	.42	1.25	26.42
1901–2	0	1.42	.54	.35	.40	.35	6.15	1.05	.11	.21	2.32	.48	13.38
5-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.30

[a] Year incomplete.

Record of precipitation at Nellie, San Diego County.

[Latitude, 33° 20′; longitude, 116° 55′; elevation, 5,240 feet. Authority, N. A. Clark.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1901–2	.....	2.55	1.75	0.55	17.60	7.34	10.21	2.20	0.25	0	0.06	0	[a]42.51

[a] Year incomplete.

Record of precipitation at San Diego, San Diego County.

[Latitude, 32° 45′; longitude, 117° 8′; elevation, 69 feet. Authorities, U. S. War Department and Weather Bureau.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1849-50	------	------	------	------	0	1.13	1.00	0.09	0	0.68	0	0	[a]2.90
1850-51	0	0.19	2.82	1.93	0.03	1.51	.34	.87	0.71	.01	0	0	8.41
1851-52	0.02	.01	.25	3.74	.58	1.84	1.87	.85	.32	0	0	0.40	9.88
1852-53	0	.06	1.45	4.50	.50	.20	1.52	.25	2.10	.05	0	.21	10.84
1853-54	0	0	1.28	1.77	.99	2.56	1.88	.89	.18	.01	0.07	1.36	10.99
1854-55	.09	.27	.04	3.29	1.97	3.59	1.30	1.52	.06	0	0	.04	12.17
1855-56	0	.11	2.15	.41	1.27	1.86	1.59	2.17	.29	0	0	0	9.85
1856-57	.07	0	1.22	1.30	.26	1.76	0	.04	.08	.03	0	.02	4.78
1857-58	.01	.49	2.16	1.30	1.52	.44	1.24	.17	0	.19	0	.04	7.56
1858-59	.10	.47	.28	3.10	0	1.89	.20	.36	.17	0	.02	0	6.59
1859-60	0	.18	1.49	1.79	.72	1.49	.15	.65	.04	.05	.14	0	6.70
1860-61	0	0	2.88	2.99	.82	.79	.05	.04	0	.19	0	0	7.76
1861-62	1.59	.05	1.19	3.20	5.56	1.39	.97	1.05	.16	.48	.11	0	15.75
1862-63	0	.89	.05	.93	.32	1.09	.33	.13	.02	0	0	0	3.76
1863-64	.36	0	.73	.04	.04	2.50	.20	.01	1.25	.01	.11	0	5.25
1864-65	0	.04	2.41	1.04	1.28	3.00	0	.56	0	.01	1.29	0	9.63
1865-66	0	.02	.52	.84	5.05	3.43	1.47	.11	.09	0	0	.10	11.63
1866-67	0	0	.24	1.82	2.32	.85	7.88	.48	.04	0	0	.30	13.93
1867-68	0	.34	.45	3.06	3.37	1.63	.73	1.20	.15	0	.51	0	11.44
1868-69	.05	0	2.00	1.52	2.88	1.88	1.98	.53	.33	0	.05	0	11.22
1869-70	0	.05	2.32	.94	.54	.77	.33	.20	.28	0	.04	.07	5.54
1870-71	0	1.54	.18	.42	.52	1.35	.01	.70	.34	0	0	0	5.06
1871-72	0	0	1.33	1.39	.99	2.63	.46	.26	.12	0	0	.18	7.36
1872-73	0	0	0	1.40	.44	4.15	.11	.10	.03	0	0	1.95	8.18
1873-74	0	0	.77	5.46	3.11	3.73	1.20	.34	.34	0	.12	0	15.07
1874-75	.11	.53	.88	.55	2.38	.37	.45	.12	.20	.02	0	.21	5.82
1875-76	.39	0	2.25	.41	2.47	2.44	1.78	.06	.05	.05	.03	.06	9.99
1876-77	.03	.08	.04	.15	1.05	.18	1.44	.26	.43	0	0	0	3.66
1877-78	0	.81	.06	3.89	1.45	4.83	1.41	2.91	.58	.16	0	0	16.10
1878-79	0	.96	0	1.57	3.54	1.04	.10	.60	T.	.07	0	0	7.88
1879-80	0	.29	2.77	6.30	.61	1.50	1.43	1.34	.06	.06	.09	.32	14.77
1880-81	0	.53	.28	4.15	.52	.45	1.88	1.35	.04	.05	0	.01	9.26
1881-82	.04	.24	.12	.30	4.53	2.55	1.02	.45	.18	.07	0	T.	9.50
1882-83	.01	.41	.39	.13	1.09	.95	.41	.31	1.14	.08	0	0	4.92
1883-84	0	2.01	.20	1.82	1.34	9.05	6.23	2.84	2.17	.31	0	T.	25.97
1884-85	.07	.35	.11	5.12	.35	.02	.78	1.20	.61	.06	T.	.13	8.80
1885-86	T.	.31	1.56	.71	6.95	1.51	3.73	1.95	.04	.07	T.	T.	16.83
1886-87	0	.05	.95	.10	.04	4.51	.02	2.14	.47	.04	.01	T.	8.33
1887-88	T.	T.	2.08	1.14	1.96	1.48	2.79	.10	.22	.04	.01	T.	9.82
1888-89	.04	.26	1.83	2.84	1.72	1.80	2.20	.19	.03	.10	T.	.04	11.05
1889-90	T.	2.12	.12	7.71	2.79	1.70	.41	.05	.08	0	0	0	14.98
1890-91	.65	.01	.72	1.61	1.21	4.84	.27	.76	.35	.05	T.	0	10.47
1891-92	.08	.04	.10	1.29	1.58	2.96	.96	.41	1.15	.13	0	.05	8.75
1892-93	T.	.22	.94	.69	.78	.47	5.50	.22	.39	T.	T.	0	9.21
1893-94	0	.11	.91	1.91	.29	.49	1.05	.11	.09	.01	0	.04	5.01
1894-95	.01	T.	0	2.26	7.33	.53	1.43	.11	.19	0	0	0	11.86
1895-96	.01	.27	1.19	.27	1.27	.02	2.89	.25	.03	.01	T.	.13	6.34
1896-97	T.	.97	.98	2.18	3.13	2.72	1.58	.02	.12	T.	.01	T.	11.71
1897-98	T.	1.06	.02	.32	1.71	.06	.91	.22	.66	.02	0	0	4.98
1898-99	.07	0	.15	.87	2.34	.30	.85	.29	.10	.27	0	07	5.31
1899-1900	0	.35	.86	.65	.69	.03	.53	1.26	1.45	.08	0	T.	5.90
1900-1901	T.	.30	1.43	0	2.08	4.77	1.07	.01	.77	.02	T.	T.	10.45
1901-2	.06	.28	.41	.02	1.70	1.57	1.86	.21	.06	T.	.92	T.	7.09
52-year mean	------	------	------	------	------	------	------	------	------	------	------	------	9.50

[a] Year incomplete.

Record of precipitation at Warners, San Diego County.

[Latitude, 33° 5′; longitude, 116° 40′; elevation, 2,894 feet. Authority, Charles E. McGary.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1900–1901	------	------	1.93	-------	2.58	5.98	0.35	0.20	0.97	------	------	------	[a] 12.01

[a] Year incomplete.

Record of precipitation at Santa Barbara, Santa Barbara County.

[Latitude, 34° 25′; longitude, 119° 40′; elevation, 100 feet. Authority, United States War Department and Weather Bureau.

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1867–68	0	0	2.31	12.67	3.97	2.00	1.08	2.44	.72	0	0	0	25.19
1868–69	0	0	1.25	4.26	3.26	2.12	4.22	.46	.20	0	0	0	15.77
1869–70	0	0.30	.65	.57	.25	5.87	.83	.99	.74	0.07	0	0	10.27
1870–71	0	1.04	.27	1.41	.86	2.92	.02	2.02	.37	0	0	0	8.91
1871–72	0	.09	1.83	6.56	2.53	1.81	.18	1.80	0	.14	0	0.02	14.96
1872–73	0.05	0	0	4.34	.58	5.48	.05	0	0	0	0	0	10.50
1873–74	0	0	.27	5.26	4.54	3.17	.78	.28	.14	0	0	0	14.44
1874–75	0	1.91	1.30	0	14.84	.18	.38	.10	0	0	0	0	18.71
1875–76	0	0	6.53	.31	7.56	5.67	2.73	.27	0	0	0	0	23.07
1876–77	0	.32	0	0	2.72	0	.82	.18	.45	0	0	0	4.49
1877–78	0	0	1.32	3.12	7.17	11.73	2.47	3.34	.29	.07	0	0	29.51
1878–79	0	.32	0	5.16	5.24	.71	.34	1.60	.21	0	0	0	13.58
1879–80	0	.41	1.62	4.57	1.30	10.86	1.15	5.73	0	0	0	0	25.64
1880–81	0	.25	.28	9.73	2.83	.30	1.25	.59	0	0	0	0	15.23
1881–82	.44	1.47	.33	.95	1.13	2.38	5.74	1.63	0	.20	0	0	14.27
1882–83	0	.37	.77	.10	2.18	2.92	3.64	.29	2.79	.35	0	0	13.41
1883–84	0	1.32	0	2.76	6.33	9.68	9.77	2.60	.39	1.62	0	0	34.47
1884–85	0	1.02	.79	6.62	1.23	.07	.35	3.00	0	0	0	0	13.08
1885–86	0	.19	9.84	2.47	5.12	1.19	2.03	3.40	0	0	0	0	24.24
1886–87	0	.39	.87	.86	.31	8.64	.13	1.43	.33	.03	0	0	12.99
1887–88	.38	.31	1.10	4.43	10.15	1.30	3.86	.16	.02	T.	T.	T.	21.71
1888–89	.03	.07	5.62	5.59	.29	1.29	7.31	.49	.76	.13	0	0	21.58
1889–90	0	8.65	3.21	10.64	5.32	2.96	1.10	.31	.18	0	0	0	32.37
1890–91	1.50	0	.48	3.53	.50	8.82	1.65	1.90	0	0	0	0	18.38
1891–92	.18	0	0	2.26	1.04	2.48	3.36	.34	.62	0	0	0	10.28
1892–93	0	.42	3.70	7.31	4.52	3.55	7.53	.38	0	0	0	0	27.41
1893–94	0	.62	T.	3.50	.65	.50	.22	.35	.86	0	.15	0	6.85
1894–95	1.36	.78	.11	4.16	6.25	.67	1.99	.46	.02	.05	T.	0	15.85
1895–96	0	.55	.77	.93	6.84	0	2.37	1.78	.08	.05	.40	0	13.77
1896–97	0	.92	3.51	2.92	4.35	3.65	2.73	.02	0	0	0	0	18.10
1897–98	0	1.44	0	0	.63	1.39	.28	T.	1.25	0	T.	0	4.99
1898–99	3.17	.14	0	.36	4.48	0	2.78	.64	0	.78	0	0	12.35
1899–1900	0	2.06	1.97	2.35	2.32	.05	1.58	.42	1.90	.01	.02	T.	12.68
1900–1901	.04	.15	3.99	.02	4.86	3.65	.16	2.07	.34	.10	.06	.09	15.53
1901–2	.36	2.42	1.16	T.	1.36	4.40	2.89	1.40	.07	0	0	0	14.06
35-year mean	------	------	------	------	------	------	------	------	------	------	------	------	16.82

Record of precipitation at Mount Hamilton (Lick Observatory), Santa Clara County.

[Latitude, 37° 20′; longitude, 121° 38′; elevation, 4,440 feet. Authority, Lick Observatory.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1880–81	.....	.....	.....	.....	3.11	5.99	1.13	0.98	0.09	0.33	0	0	[a]11.63
1881–82	0.10	0.33	0.91	9.72	3.55	2.90	5.40	4.70	.48	1.06	0	0	29.15
1882–83	0	6.16	3.45	1.93	3.10	3.75	8.66	2.66	7.56	0	0	0	37.27
1883–84	.65	2.60	1.48	2.05	5.60	12.76	16.35	11.96	1.24	3.85	0	0.15	58.69
1884–85	.65	3.71	.01	33.84	1.99	.57	1.15	2.08	.16	.36	0	0	44.52
1885–86	.15	.05	3.01	6.76	4.53	1.80	5.77	6.79	.70	0	0	0	29.56
1886–87	0	.60	2.82	2.34	2.83	7.80	1.39	5.75	.25	.30	0.04	0	24.12
1887–88	.33	.09	.90	11.25	10.04	1.38	3.40	.68	1.25	0	0	.02	29.34
1888–89	.49	.03	3.27	4.23	1.04	1.42	6.17	1.92	3.21	.05	0	0	21.83
1889–90	0	4.38	4.69	13.19	7.92	2.04	4.39	1.79	2.42	0	0	0	40.82
1890–91	.80	.02	.58	5.39	1.38	6.52	4.26	3.08	1.12	.57	0	0	23.72
1891–92	.28	.61	.38	9.54	1.97	2.99	5.98	1.90	3.52	.32	0	T.	27.49
1892–93	.24	.38	10.30	5.56	3.29	3.40	8.99	3.61	.95	.16	0	0	36.88
1893–94	.48	.66	4.01	3.38	8.74	10.52	2.54	.89	2.78	.64	.02	T.	34.66
1894–95	1.64	2.98	.84	11.90	10.00	3.08	1.46	2.30	2.39	0	.01	0	36.60
1895–96	.08	.78	2.46	3.16	9.54	1.08	3.83	6.70	2.10	.03	T.	.28	30.04
1896–97	.47	1.91	5.77	4.93	3.50	5.92	3.40	.78	.27	.39	0	0	27.34
1897–98	.07	1.26	1.51	2.70	1.50	4.16	2.04	.83	2.41	.38	0	0	16.86
1898–99	.29	1.33	1.33	2.13	5.63	.75	11.11	1.40	1.47	.39	0	.12	25.95
1899–1900	T.	6.37	4.92	4.16	3.26	1.70	3.37	4.06	1.35	T.	.01	.02	29.22
1900–1901	.08	3.48	7.76	2.21	5.74	5.92	1.98	3.33	1.07	.02	0	.05	31.64
1901–2	1.07	2.29	2.89	1.61	1.47	9.25	5.18	2.98	1.19	0	0	0	27.93
21-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31.60

[a] Year incomplete.

Record of precipitation at Delta, Shasta County.

[Latitude, 41° 00′; longitude, 122° 23′; elevation, 1,138 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1882–83	0.10	9.20	8.14	3.94	1.00	0	14.46	8.49	9.94	0	0	0	55.27
1883–84	0	6.18	1.10	4.24	15.57	4.55	13.44	16.55	2.73	7.12	0.25	0	71.73
1884–85	1.03	6.01	.56	16.24	2.91	2.53	.37	2.54	.67	1.60	0	0	34.46
1885–86	0	.60	29.38	12.94	9.95	.50	3.52	10.19	8.16	.60	0	0	75.84
1886–87	T.	1.30	.30	8.81	3.84	10.27	3.37	5.53	1.26	.82	0	0	35.50
1887–88	0	0	.75	2.23	10.40	4.67	1.70	0	2.45	3.30	0	0	25.50
1888–89	(0.16)	(7.14)	(7.18)	10.56	.15	1.02	37.52	2.91	5.81	1.07	0	0	73.52
1889–90	0	26.71	10.03	25.83	17.18	21.11	16.50	4.78	2.33	0	0	0	124.47
1890–91	1.00	.40	0	7.24	3.72	13.70	2.06	8.95	4.76	1.98	.75	0	44.56
1891–92	1.31	2.24	1.99	7.21	5.55	4.01	8.34	6.31	5.22	.04	.10	0	42.32
1892–93	1.52	3.40	13.08	19.51	3.17	2.10	11.90	8.90	3.30	0	T.	0	66.88
1893–94	2.85	.15	8.05	3.10	14.30	3.70	2.60	2.75	3.50	2.25	0	T.	43.25
1894–95	4.00	7.33	3.30	33.17	18.55	7.03	7.72	1.71	6.85	0	1.07	0	90.73
1895–96	5.18	0	2.15	5.98	31.42	.60	11.81	16.72	6.92	.07	0	T.	80.85
1896–97	T.	3.50	12.00	17.23	4.66	7.13	4.63	1.30	0	2.75	0	0	53.20
1897–98	0	3.40	3.55	6.05	.75	13.55	0	1.35	5.85	1.40	0	0	35.90
1898–99	0	1.95	3.35	2.00	8.19	(6.13)	11.81	.65	1.10	4.05	0	0	39.23
1899–1900	0	9.85	19.60	6.40	12.25	4.60	9.45	8.59	4.10	1.56	.17	0.20	76.77
1900–1901	.97	15.68	10.51	8.04	13.43	9.28	1.58	6.81	.65	0	0	0	66.95
1901–2	2.28	2.95	11.27	5.55	2.92	39.82	8.48	7.70	4.02	.32	T.	.28	85.59
20-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61.13

Record of precipitation at Fort Crook, Shasta County.

[Latitude, 40° 10′; longitude, 121° 20′; elevation, 3,390 feet. Authority, U. S. War Department.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1857–58	------	------	------	------	2.23	4.38	2.57	1.28	0.13	0.34	0	0.03	[a]10.96
1858–59	0.04	3.67	1.32	6.39	1.81	5.96	4.06	1.26	.60	0	0	.05	25.16
1859–60	1.80	0	3.85	1.00	2.14	.27	5.10	3.09	3.06	.44	2.22	0	22.97
1860–61	.23	2.97	1.33	5.04	1.20	4.78	4.03	1.82	1.33	.66	0	0	23.39
1861–62	0	.09	6.18	9.75	8.22	4.89	3.53	2.64	2.59	2.45	.02	0	40.36
1862–63	.40	.09	0	1.81	3.60	3.09	2.80	1.00	.40	0	0	0	13.19
1863–64	0	.39	.06	2.00	1.10	0	.58	1.00	1.34	.35	0	0	6.82
1864–65	0	1.05	7.00	7.47	3.16	2.16	2.23	1.20	1.30	.60	0	0	26.17
1865–66	1.02	1.55	8.75	------	------	------	8.25	.87	------	------	------	------	[a]20.44
1866–67	0	0	.80	11.75	5.27	4.44	.75	1.86	.50	.30	0	0	25.67
1867–68	.80	.73	1.12	------	------	------	------	------	------	1.67	.16	0	[a]4.48
1868–69	0	.50	.56	3.25	2.85	------	4.82	1.56	------	------	------	------	[a]13.54
8-year mean	------	------	------	------	------	------	------	------	------	------	------	------	22.97

[a] Year incomplete.

Record of precipitation at Redding, Shasta County.

[Latitude, 40° 33′; longitude, 122° 27′; elevation, 565 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1890–91	------	------	------	------	1.68	9.95	3.05	2.31	3.17	1.91	0.75	0	[a]22.82
1891–92	0.13	0.02	0.08	8.36	1.19	1.32	1.41	2.31	3.23	.20	0	0	18.25
1892–93	0	2.46	8.96	14.27	4.18	4.75	9.17	3.94	1.35	0	0	0	49.08
1893–94	3.05	.27	7.60	3.97	9.69	7.65	3.20	2.60	1.31	.65	0	0.42	40.41
1894–95	1.59	5.85	.99	15.35	12.84	3.08	2.78	.99	2.61	0	.95	T.	47.03
1895–96	3.24	.01	2.12	4.36	14.52	.79	4.17	4.05	8.97	.55	T.	.38	42.96
1896–97	.81	1.99	6.30	8.98	4.42	6.80	5.29	3.02	0	1.59	0	0	39.20
1897–98	.15	1.36	1.69	3.60	.54	3.77	0	.76	3.64	.15	0	T.	15.66
1898–99	.13	1.56	2.23	2.35	9.66	1.04	8.86	.61	.82	2.46	0	.08	29.80
1899–1900	0	4.83	8.50	4.18	6.45	2.86	3.68	2.59	3.12	1.38	T.	.16	37.75
1900–1901	2.48	6.47	3.03	3.14	6.33	5.52	.57	5.11	.41	T.	.01	T.	33.07
1901–2	3.11	3.08	6.45	4.37	1.37	19.97	4.73	4.69	2.94	0	.01	.03	50.75
11-year mean	------	------	------	------	------	------	------	------	------	------	------	------	36.72

[a] Year incomplete.

Record of precipitation at Sims, Shasta County.

[Latitude, 41° 05′; longitude, 122° 21′; elevation, 1,387 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1887–88	------	------	------	------	------	------	4.74	1.00	2.53	4.37	0.14	0	[a]12.78
1888–89	0.10	0	------	9.21	0.42	------	------	1.87	3.55	2.73	0	0	[a]17.88
1889–90	0	28.57	13.32	19.85	17.84	18.30	19.83	5.53	2.64	.65	0	0	126.53
1890–91	1.44	0	0	8.80	4.01	5.29	2.85	6.03	4.36	2.17	.40	0	35.35
1891–92	1.50	4.08	3.51	7.36	1.12	4.39	8.81	8.39	7.27	.74	.19	0	47.36
1892–93	1.24	1.64	13.39	26.92	3.50	4.39	8.94	9.67	4.57	T.	0	0	74.26
1893–94	------	------	------	3.48	10.98	4.40	6.37	1.00	3.42	2.52	T.	0.36	[a]32.53
1894–95	2.80	1.65	------	------	------	------	------	------	------	------	------	------	[a]4.45
4-year mean	------	------	------	------	------	------	------	------	------	------	------	------	70.88

[a] Year incomplete.

Record of precipitation at Coles, Siskiyou County.

[Latitude, 42° 00′; longitude, 122° 39′; elevation, 2,905 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1887–88	------	------	------	------	------	------	1.21	0.24	1.90	2.79	0.85	T.	[a]6.99
1888–89	0.85	0	1.43	1.32	------	0.15	2.20	.96	2.74	.10	------	------	[a]9.75

[a] Year incomplete.

Record of precipitation at Dunsmuir, Siskiyou County.

[Latitude, 41° 12′; longitude, 122° 16′; elevation, 2,285 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1888–89	0	0	6.83	2.95	0.30	0.33	4.39	2.43	7.06	1.12	0	0	25.41
1889–90	0	20.15	11.65	20.57	23.60	16.50	11.85	11.85	2.45	.40	0	0	119.02
1890–91	0.90	0	0	8.05	.55	2.59	2.70	4.95	3.07	2.88	0.67	0.07	26.43
1891–92	1.52	2.13	2.32	9.65	2.41	3.31	5.30	5.48	3.96	1.22	.35	0	37.65
1892–93	.05	2.68	7.47	14.03	3.65	6.40	13.30	8.75	4.06	0	.20	0	60.59
1893–94	3.27	1.15	11.35	5.08	17.53	7.60	6.05	1.70	4.35	2.10	0	0	60.18
1894–95	.20	9.65	2.90	29.30	15.30	6.50	8.15	2.55	4.40	0	1.55	0	80.50
1895–96	5.75	.05	1.40	4.39	22.25	1.54	10.23	11.43	6.22	.17	.34	0	63.77
1896–97	1.46	0	11.07	13.94	4.08	10.63	6.33	1.02	.14	2.35	0	0	51.02
1897–98	0	2.78	4.34	4.98	9.76	10.62	0	1.20	4.20	1.50	0	0	39.38
1898–99	.53	1.71	2.98	11.43	6.80	.50	10.31	.48	1.60	1.90	0	.90	39.14
1899–1900	T.	7.10	15.29	7.40	9.93	3.32	6.27	4.85	3.18	.90	0	T.	58.24
1900–1901	1.20	6.13	7.16	8.29	8.93	6.90	1.92	2.58	T.	0	0	0	43.11
1901–2	0	0	10.88	5.06	2.69	29.40	3.76	1.21	1.74	0	T.	.05	54.79
14-year mean	------	------	------	------	------	------	------	------	------	------	------	------	54.23

Record of precipitation at Edgewood, Siskiyou County.

[Latitude, 41° 28′; longitude, 122° 23′; elevation, 2,955 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1888–89	0.89	0.15	2.00	0.75	0.30	0.10	8.43	0.69	2.30	0.11	0.33	0	16.05
1889–90	0	7.80	2.35	5.30	5.60	5.90	5.04	.70	1.60	1.72	0	0.45	36.46
1890–91	1.05	.22	0	3.00	.55	2.45	.18	1.96	2.04	1.45	.67	.05	13.62
1891–92	.84	.43	.20	2.80	.15	.12	2.67	.86	1.63	.69	.80	0	11.19
1892–93	.58	1.07	5.35	7.88	.95	.20	2.90	3.48	.95	.30	.66	0	24.32
1893–94	1.51	.76	2.65	.85	5.13	.50	1.83	.15	3.56	.72	0	.46	18.12
1894–95	.69	1.75	.82	9.55	4.56	.36	2.84	.08	.73	0	0	.94	22.32
1895–96	1.59	.05	.75	.51	6.64	.30	2.68	4.66	1.35	.42	.07	.77	19.79
1896–97	.71	.40	3.45	5.16	1.18	1.63	1.85	.15	2.03	1.78	0	.35	18.69
1897–98	0	1.27	1.90	2.68	.90	4.75	.17	1.64	2.49	.51	0	.99	17.30
1898–99	T.	.78	1.51	0	0	.52	1.67	.19	1.72	.29	0	.42	7.10
1899–1900	0	1.87	3.79	2.21	3.37	.91	1.85	2.25	1.58	.85	.11	.23	19.02
1900–1901	.68	4.97	.91	2.77	1.00	3.21	.18	1.02	.98	0	.48	.65	16.85
1901–2	1.16	0	2.28	2.24	.37	7.88	2.46	3.47	.97	.10	.32	.86	22.11
14-year mean	------	------	------	------	------	------	------	------	------	------	------	------	18.78

Record of precipitation at Fort Jones, Siskiyou County.

[Latitude, 41° 35′; longitude, 122° 51′; elevation, 2,570 feet. Authority, U. S. War Department.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1852–53	.....	.....	.....	.....	3.78	1.38	3.39	1.02	1.17	0.41	0.13	.....	[a]11.28
1853–54	0.20	0.48	4.47	1.19	.54	2.62	.75	1.99	.21	.63	.20	0.21	13.49
1854–55	0	4.18	.48	1.13	1.58	3.83	5.24	1.50	.87	.08	0	0	18.89
1855–56	.20	1.40	1.77	6.47	1.59	.42	1.18	1.84	2.77	.60	0	.20	18.44
1856–57	0	.13	1.78	8.93	3.62	7.59	2.35	0	.69	1.86	0	0	26.95
1857–58	.60	.80	4.47	4.24	6.15	8.78	3.69	1.15	1.55	.60	0	0	32.03
5-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21.96

[a] Year incomplete.

Record of precipitation at Hornbrook, Siskiyou County.

[Latitude, 41° 50′; longitude, 122° 50′; elevation, 2,154 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1887–88	0.15	0.12	0.92	2.58	1.16	1.08	0.61	T.	2.58	2.74	0.15	0.17	12.26
1888–89	.32	0	2.57	2.94	.60	.10	2.07	0.43	2.34	0	0	0	11.37
1889–90	0	1.95	2.93	2.92	6.00	9.91	.70	.20	.44	.60	.85	.46	26.96
1890–91	0	0	0	1.90	.35	2.99	.67	.90	2.40	1.60	.35	0	11.16
1891–92	.55	.65	.70	4.55	.70	.35	1.40	1.50	.50	.60	0	0	11.50
1892–93	.45	.68	2.65	3.98	1.05	1.15	.30	1.50	1.20	T.	.95	0	13.91
1893–94	.80	1.60	4.17	3.33	3.20	.70	1.50	0	3.78	1.12	0	0	20.20
1894–95	0	1.30	.70	2.30	2.40	.20	2.69	.20	1.20	1.50	.60	.60	13.69
1895–96	.55	0	.60	2.95	6.30	.90	2.47	2.00	1.80	0	.80	.57	18.94
1896–97	.58	2.02	6.04	5.85	.85	2.10	.80	.40	0	0	0	0	18.64
1897–98	0	.60	4.48	3.18	2.95	.10	0	0	.81	0	0	0	12.12
1898–99	.28	1.45	3.02	.77	2.17	.63	3.90	0	.10	.10	0	T.	12.42
1899–1900	0	1.27	4.66	2.80	3.24	.02	6.10	.57	.46	.55	0	0	19.67
1900–1901	0	3.81	3.96	3.13	3.60	2.13	.10	0	.13	0	0	.10	16.96
1901–2	1.10	.70	1.17	.93	0	4.96	.55	1.11	1.27	.51	T.	.60	12.90
15-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15.51

Record of precipitation at Montague, Siskiyou County.

[Latitude, 41° 44′; longitude, 122° 31′; elevation, 2,542 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1888–89	0.61	0.16	0.98	0.30	0.50	0.04	1.78	0.55	1.70	0.60	0	0	7.22
1889–90	0	3.20	1.60	3.74	3.70	6.05	3.60	.33	.82	1.15	0	0.35	24.54
1890–91	.90	0	0	1.40	.70	2.33	.75	.45	1.74	1.25	.45	0	9.97
1891–92	.15	.20	.35	1.83	.10	T.	.75	.40	1.40	0	.35	0	5.53
1892–93	0	0	1.25	2.21	.51	1.88	.87	1.75	.44	0	0	0	8.91
1893–94	.72	.44	3.05	2.34	2.72	2.13	2.28	.05	2.50	1.04	0	0	17.27
1894–95	0	1.00	.54	1.75	2.25	.55	.40	0	.81	0	T.	0	7.30
1895–96	.44	0	.56	1.58	3.40	.40	1.49	.81	.96	0	0	.48	10.12
1896–97	0	0	•2.25	1.43	1.49	2.66	1.35	0	0	1.11	0	0	10.29
1897–98	0	0	.76	1.63	.30	1.63	.10	0	.80	0	0	0	5.22
1898–99	0	.16	2.18	.20	.72	.22	1.50	.20	.60	.53	0	.56	6.87
1899–1900	0	.90	3.15	2.95	.....	.....	.....	.....	.....	.....	.....	.....	[a]7.00
11-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.29

[a] Year incomplete.

Record of precipitation at Scott Valley, Siskiyou County.

[Latitude, 41° 45′; longitude, 123° 02′; elevation, 2,570 feet. Authority, Isaac Titcomb.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1858–59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.50	[a]0.50
1859–60	0.87	1.00	4.33	0.75	2.59	1.25	4.12	0.75	2.00	0.50	1.62	.24	20.02
1860–61	.49	2.22	2.00	5.74	1.12	2.50	2.50	3.00	.54	.30	0	0	20.41
1861–62	0	.51	11.56	10.63	9.29	3.75	1.32	2.00	1.00	.80	.10	0	40.96
1862–63	.02	.15	.12	1.90	4.75	1.75	2.45	2.00	.40	1.93	.25	.09	15.81
1863–64	.40	.25	1.85	6.17	2.07	.43	.82	2.70	.51	.31	0	.63	16.14
1864–65	.04	.31	6.00	12.75	1.87	2.40	1.30	.32	.05	.75	.35	.02	26.16
1865–66	1.15	1.33	9.79	1.21	6.59	3.50	9.20	.02	1.72	.62	.50	.47	36.10
1866–67	0	.08	2.51	11.75	9.12	2.02	.64	1.34	.41	.04	0	.26	28.17
1867–68	.40	.88	1.75	9.68	3.06	1.50	3.70	1.14	.18	1.06	0	0	23.35
1868–69	.06	.50	.77	2.80	5.76	1.13	1.32	3.61	1.52	.69	.13	0	18.29
1869–70	1.00	.01	3.04	3.56	5.00	2.91	1.73	1.37	1.12	.13	0	0	19.87
1870–71	.01	.02	1.00	3.50	1.86	2.47	1.62	2.27	.55	.26	.35	0	13.91
1871–72	.37	.05	1.62	7.68	4.18	6.94	1.40	.34	.25	.03	.01	.01	22.88
1872–73	.41	.16	2.67	3.38	1.33	3.00	1.05	1.50	.27	.03	.03	.05	13.88
1873–74	.37	.94	1.71	4.49	6.38	1.80	3.65	1.55	.71	.13	.01	.09	21.83
1874–75	0	1.55	4.33	.43	3.13	.17	1.79	.35	.75	.12	.38	.05	13.05
1875–76	0	4.45	7.31	7.33	2.26	3.33	3.94	.71	1.19	.18	.34	1.50	32.54
1876–77	1.02	3.75	.54	.01	1.71	4.23	3.10	1.23	1.48	.71	.12	.02	17.92
1877–78	.01	.45	.67	1.62	9.72	6.53	3.74	.27	.20	.12	.01	.06	23.40
1878–79	.36	2.81	2.16	1.14	3.25	3.54	8.39	2.66	1.40	.27	.38	.47	26.83
1879–80	.11	.81	4.64	4.58	10.62	2.32	2.65	5.39	1.32	.02	.37	.07	32.90
1880–81	0	.18	.32	6.76	13.95	6.53	.79	1.19	.17	1.04	.54	.04	31.51
1881–82	.76	3.53	2.40	4.60	4.48	5.69	2.22	2.45	1.29	.08	2.49	0	29.99
1882–83	1.44	2.86	2.72	3.75	2.58	1.51	1.11	3.25	2.65	0	.40	.63	22.90
1883–84	.66	2.41	1.11	4.75	4.28	3.14	3.45	3.06	1.65	.87	1.62	.01	27.01
1884–85	.60	1.04	.16	8.18	2.50	3.49	.11	1.98	1.40	1.40	1.16	.01	22.03
1885–86	.83	.53	10.24	3.26	7.22	1.32	1.32	3.23	1.77	.03	2.13	.85	32.73
1886–87	0	1.85	.78	6.67	5.18	4.96	1.07	2.63	.94	.36	.37	.18	24.99
1887–88	.36	.09	1.75	5.88	6.18	1.77	2.43	.18	1.80	4.21	.60	.11	25.36
1888–89	.58	.40	1.94	1.59	2.71	.50	4.35	2.56	4.71	.19	1.11	0	20.64
1889–90	0	3.95	3.37	12.84	21.81	11.10	.....	.....	.....	.....	.....	.....	[a]53.07
30-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24.05

[a] Year incomplete.

Record of precipitation at Sissons, Siskiyou County.

[Latitude, 41° 27′; longitude, 122° 25′; elevation, 3,555 feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1881–82	0.99	2.53	3.34	8.54	6.35	2.90	1.74	1.65	0.60	0	0	0	28.64
1882–83	1.19	4.44	3.20	1.65	.99	1.10	10.15	6.15	0	0	0	0	28.87
1888–89	.40	3.70	2.17	2.91	.60	.40	16.27	.63	2.40	0.23	0	0	29.71
1889–90	0	16.45	5.80	16.13	5.69	9.33	5.30	2.98	2.75	.44	0	0	64.87
1890–91	1.20	.13	0	3.18	.40	7.17	.61	3.64	2.65	.44	0.60	0	20.02
1891–92	.32	.30	.35	11.20	2.34	.66	4.19	5.38	3.74	.39	0	0	28.87
1892–93	1.71	1.03	8.75	9.57	3.10	2.80	2.77	2.60	2.66	.03	0	0	35.02
1893–94	.68	.61	4.25	2.87	10.72	2.60	3.45	.70	2.85	2.25	0	0	30.98
1894–95	.99	3.65	1.70	11.13	9.12	1.24	3.84	1.27	2.05	0	.55	0	35.54
1895–96	4.65	3.70	.70	4.31	21.09	.21	4.16	3.55	3.02	0	.13	0.31	45.83
1896–97	.....	.....	.....	.....	2.59	4.86	.43	.53	0	.15	0	0	[a]8.56
1897–98	0	2.31	2.62	3.72	0	10.45	4.70	1.05	6.13	1.03	.13	0	32.14
1898–99	0	0	1.70	2.10	5.55	1.03	2.98	.23	1.32	.89	0	1.32	17.12
1899–1900	0	4.01	10.83	5.67	8.64	1.04	9.92	3.49	2.05	1.24	0	.16	47.05
1900–1901	.67	10.76	4.52	3.80	11.97	8.99	.62	2.73	.95	0	26	.36	45.63
1901–2	2.08	1.93	6.58	2.77	1.83	21.73	4.14	5.08	2.87	T.	.38	4.16	53.55
15-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36.26

[a] Year incomplete.

Record of precipitation at Walla Walla Creek, Siskiyou County.

[Latitude, 41° 42′; longitude, 122° 55; elevation, 3,000 feet. Authority, S. Titcomb.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1888–89	------	------	------	------	1.86	0.25	3.85	1.66	3.46	0.19	1.11	0	[a]12.38
1889–90	0	3.95	3.37	8.09	11.86	9.10	4.93	1.24	1.29	.28	0	0.85	44.96
1890–91	1.84	.10	.19	3.85	1.70	6.13	2.03	1.11	3.28	.99	.22	.40	21.84
1891–92	1.18	.39	1.10	12.40	2.38	.47	2.39	2.94	1.29	.76	.35	0	25.65
1892–93	.82	------	------	------	------	------	------	------	------	------	------	------	[a].82
3-year mean	------	------	------	------	------	------	------	------	------	------	------	------	30.82

[a] Year incomplete.

Record of precipitation at Yreka, Siskiyou County.

[Latitude, 41° 45′; longitude, 122° 32′; elevation, 2,635 feet. Authority, Dr. L. Antervinth].

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1871–72	0.33	1.24	1.98	2.61	3.83	1.91	1.67	2.04	0.44	0	0.14	0	16.19
1872–73	.25	1.55	1.43	3.92	1.28	1.77	.40	.90	.60	0	0	0	12.10
1873–74	.44	.55	1.17	2.20	3.78	1.62	1.49	.74	.34	0.44	0	0	12.77
1874–75	0	1.29	2.16	0	4.35	.19	1.49	.17	.51	.30	.07	0	10.53
1875–76	0	3.34	5.29	6.07	2.00	1.93	2.07	.42	.65	.20	.32	0.19	22.48
1876–77	.90	3.05	.43	.26	1.20	3.24	1.48	.74	1.56	.65	.18	0	13.69
1877–78	.90	.20	3.84	.95	6.12	3.91	2.80	.37	.56	0	.75	0	20.40
1878–79	.25	.45	1.15	.45	1.53	1.41	3.96	1.56	1.42	.39	.22	.15	12.94
1879–80	.25	.77	2.32	7.23	2.43	.61	1.20	2.23	.41	.15	0	0	17.00
1880–81	0	.13	.10	2.42	11.78	2.58	.19	.48	0	1.23	0	0	18.91
1881–82	.30	3.24	.68	1.60	1.81	1.96	.42	1.20	1.02	0	0	0	12.23
1882–83	.90	1.88	1.89	2.09	1.38	.47	.53	1.26	1.76	0	.33	.25	12.74
1883–84	.33	1.35	.66	2.95	2.10	1.20	2.34	1.41	1.40	1.78	1.33	.51	17.36
1884–85	.33	0	.79	6.19	1.16	2.94	0	1.12	3.65	1.66	.58	0	18.42
1885–86	.49	.29	2.98	2.10	4.03	.91	.74	1.78	1.05	0	1.51	.15	16.03
1886–87	0	1.69	.30	4.14	3.21	3.01	.41	2.35	1.42	.84	1.28	.31	18.96
1887–88	.21	0	1.04	1.99	4.90	1.19	1.16	.11	1.12	2.39	.24	0	14.35
1888–89	.87	.34	1.13	0	1.30	1.30	2.12	1.32	1.70	.10	.94	0	11.12
1889–90	0	3.53	2.23	4.08	3.59	8.89	3.09	------	------	------	------	------	[a]25.41
1890–91	------	------	------	------	------	3.59	1.15	.93	1.48	1.36	.41	0	[a]8.92
1891–92	.82	.43	2.20	3.92	1.65	.15	1.02	1.02	1.20	.87	.31	0	13.59
1892–93	.61	.05	3.37	3.64	1.20	2.53	1.53	2.10	.87	.32	.58	.08	16.88
1893–94	1.12	.54	7.83	2.11	7.59	3.22	3.32	.10	3.31	.70	.77	.41	31.02
1894–95	.01	1.60	.57	5.40	5.30	1.03	2.26	.81	1.59	0	.43	.68	19.68
1895–96	.82	T.	.86	4.31	7.37	1.08	1.89	2.28	2.75	.81	.73	1.01	23.91
1896–97	.52	.89	5.02	3.70	.42	3.89	2.18	.39	.58	1.51	0	.20	19.30
1897–98	.12	.68	2.94	3.76	.83	1.44	.42	.48	2.08	.10	.02	.05	12.92
1898–99	.14	.51	2.74	1.04	2.75	1.95	1.77	.21	.62	.61	.03	.12	12.49
1899–1900	.07	2.34	5.00	3.80	1.35	2.13	1.12	.42	.37	1.36	0	1.35	19.31
1900–1901	.43	3.66	2.00	3.23	8.12	2.86	.98	.40	.52	0	.01	.95	23.16
1901–2	1.24	1.28	1.81	3.09	.39	6.68	1.53	1.21	1.08	.03	.19	.01	18.54
29-year mean	------	------	------	------	------	------	------	------	------	------	------	------	16.88

[a] Year incomplete.

Record of precipitation at Weaverville, Trinity County.

[Latitude, 40° 46′; longitude, 123° 25′; elevation, 2,162 feet. Authority, George E. Noonan.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1869–70	1.06	1.03	8.01	6.15	10.11	9.64	2.05	1.06	0.22	0	0	0	39.33
1870–71	.64	1.39	6.41	9.43	8.16	11.19	3.02	1.73	1.03	0.14	0	0	43.14
1871–72	.29	.40	11.50	3.52	19.62	15.03	3.11	2.43	.84	.17	0	0.25	57.22
1872–73	.25	.78	3.01	6.32	6.51	4.29	2.78	.50	.27	0	0	0	24.81
1873–74	1.80	4.39	4.02	9.57	15.40	4.41	3.12	3.58	2.67	.70	0	0	49.66
1874–75	0	1.57	10.30	1.32	6.59	.46	2.14	.19	1.22	.93	0	0	24.72
1875–76	0	2.82	15.39	11.94	9.69	9.49	8.23	2.79	1.63	.15	0.47	0	62.60
1876–77	.67	7.38	1.50	.29	6.27	6.24	4.52	2.26	1.62	1.72	.02	.21	32.70
1877–78	0	1.83	8.72	6.50	19.83	16.20	8.53	2.42	1.07	.07	.02	.03	65.22
1878–79	1.28	1.80	3.58	4.91	2.02	6.48	12.84	4.05	4.02	.68	.02	.03	41.71
1879–80	.03	2.08	8.09	13.20	6.64	2.59	4.72	10.78	1.46	.23	.38	.36	50.56
1880–81	0	.55	1.49	14.14	18.61	11.05	1.21	3.13	1.15	.99	0	0	52.32
1881–82	.93	3.77	2.58	8.00	4.19	6.90	3.62	2.44	1.29	0	0	0	33.72
1882–83	1.38	8.36	.73	5.05	4.46	1.50	3.24	5.00	3.72	0	0	0	33.49
1883–84	.88	2.45	1.50	4.97	8.81	3.56	5.10	6.29	1.60	2.93	.13	0	38.22
1884–85	.44	.11	16.56	6.78	3.68	3.70	.15	2.78	.51	1.41	0	0	36.12
1885–86					8.71	.80	2.94						[a] 12.45
16-year mean													42.85
1893–94					11.47	5.02	4.60		2.22				[a] 23.31

[a] Year incomplete.

Record of precipitation at Milo, Tulare County.

[Latitude, 36° 15′; longitude, 118° 50′; elevation, 3,200 feet. Authority, Henry Murphy.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1900–1901					5.74	4.06	1.33	2.45	3.36	0	0	0	[a] 16.94
1901–2	0.51	1.89	1.47	0.27	1.00	6.47	4.33	1.69	.54	0	T.	0	18.08

[a] Year incomplete.

Record of precipitation at Mountain Home, Tulare County.

[Latitude, 36° 10′; longitude, 118° 48′; elevation, 6,680 feet. Authority, Fred Moller and N. T. Bailey.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1895–96					14.36	0.84	8.93	8.63	1.30	2.70	0.65	0.50	[a] 37.91
1896–97		0.60	0.40	1.95	5.70	7.45	6.07	.40	1.85	.20	.25	0	[a] 24.87
1897–98	0.10	2.45	.73	3.31									[a] 6.59

[a] Year incomplete.

Record of precipitation at Porterville, Tulare County.

[Latitude, 36°; longitude, 119°; elevation, 461 feet. Authority, Southern Pacific Company, M. F. Murphy, agent.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1892–93	------	------	0.54	2.43	0.83	1.85	3.68	0.27	0	0	0	0	[a]9.60
1893–94	0	0	.07	.61	1.52	.83	.70	.32	0.42	1.09	0	0	5.56
1894–95	0.43	.15	.04	3.13	3.82	1.54	1.10	.41	.35	0	0	0	10.97
1895–96	0	.23	1.71	.51	1.61	T.	.67	.82	.13	0	.69	0	6.37
1896–97	0	.65	.94	.93	1.96	2.46	2.00	.30	.42	0	0	0	9.66
1897–98	0	1.19	.50	.89	.75	1.55	.68	0	.55	0	0	0	6.11
1898–99	2.10	0	.27	.35	1.01	.17	2.92	.19	.10	.85	0	T.	7.96
1899–1900	0	1.08	.88	.91	.97	.16	.89	1.94	2.41	0	T.	0	9.24
1900–1901	T.	.04	3.44	.30	2.74	1.78	.30	2.19	1.97	0	0	T.	12.76
1901–2	.41	.45	.71	T.	.84	2.96	2.28	1.53	.15	0	T.	0	9.33
10-year mean	------	------	------	------	------	------	------	------	------	------	------	------	8.76

[a] Year incomplete.

Record of precipitation at Crockers (Sequoia post-office), Tuolumne County.

[Latitude, 37° 50′; longitude, 119° 53′; elevation, 4,452 feet. Authority, H. R. Crocker.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1895–96	------	------	------	------	------	------	------	------	------	------	------	3.10	[a]3.10
1896–97	0.14	2.30	9.18	5.41	6.56	15.97	21.80	1.33	0	0.75	0	0	63.44
1897–98	.45	6.09	2.70	3.80	2.60	7.15	3.74	1.10	3.74	0	0	0	31.37
1898–99	1.58	1.87	1.85	2.12	11.72	1.80	18.09	1.60	.15	1.65	0	0	42.43
1899–1900	0	11.50	7.45	12.18	5.98	1.18	[b]4.28	3.56	1.80	.47	0	0	48.40
1900–1901	.62	9.71	17.43	1.39	16.99	15.71	3.03	6.35	3.81	0	0	0	75.04
1901–2	3.28	4.59	3.90	2.50	2.33	15.03	8.55	6.54	1.80	0	0	.11	48.63
6-year mean	------	------	------	------	------	------	------	------	------	------	------	------	51.55

[a] Year incomplete. [b] March, 1900, violent hailstorm.

Record of precipitation at Dering Creek (30 miles east of Sonora), Tuolumne County.

[Latitude, 38° 00′; longitude, 119° 40′; elevation, 7,000 feet.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1898–99	------	1.85	2.88	2.78	9.95	2.77	17.08	0.12	------	------	------	------	[a]37.43

[a] Year incomplete.

Record of precipitation at Second Garotte, Tuolumne County.

[Latitude, 37° 33′ N.; longitude, 120° 24′; elevation, 2,714 feet. Authority, J. P. Chamberlain.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1882–83	.....	.....	.....	.....	1.25	4.52	8.27	2.00	3.50	0	0	0	[a]19.54
1883–84	0.63	0.75	0.75	1.00	8.00	14.00	16.00	9.00	1.00	1.48	0	0	52.61
1884–85	0	2.00	0	18.50	4.00	0	0	1.50	0	3.50	0	0	29.50
1885–86	.25	0	18.00	5.00	10.00	1.00	5.50	6.25	.50	0	0	0	46.50
1886–87	0	1.00	1.75	2.75	1.00	13.75	1.25	5.50	0	0	0	0	27.00
1887–88	1.00	0	2.00	7.00	7.75	1.50	3.00	1.25	1.25	.25	0	0	25.00
1888–89	.50	0	5.00	4.25	.50	1.00	9.75	.50	5.75	0	0	0	27.25
1889–90	0	6.50	5.75	22.00	15.00	6.75	7.25	2.00	1.75	0	0	.25	67.25
1890–91	2.27	0	0	9.00	2.00	14.00	5.00	3.50	.25	0	0	0	36.02
1891–92	0	.25	0	11.25	2.25	3.25	7.00	2.00	6.25	0	0	0	32.25
1892–93	.25	1.25	10.00	8.75	6.00	7.25	11.25	2.50	0	0	0	0	47.25
1893–94	.50	.25	3.00	4.00	10.50	10.75	2.25	1.25	3.75	1.00	0	0	37.25
1894–95	2.00	2.00	.50	18.00	13.00	4.25	8.75	2.00	1.50	0	0	0	52.00
1895–96	0	0	1.75	2.75	12.00	0	5.55	7.25	.25	0	0	2.50	32.05
1896–97	0	3.00	6.00	4.50	4.00	10.75	9.01	.53	T.	T.	0	0	37.79
1897–98	T.	2.75	1.00	2.50	2.75	6.00	2.50	.25	2.50	0	0	0	20.25
1898–99	2.00	1.50	1.50	1.00	6.76	1.00	14.00	.53	1.00	T.	T.	0	29.29
1899–1900	0	6.72	6.75	6.00	5.25	1.25	3.75	4.00	1.50	0	0	0	35.22
1900–1901	.25	5.00	14.00	1.50	11.00	17.75	1.25	4.00	1.00	0	0	0	55.75
1901–2	2.25	2.25	2.00	2.00	1.25	11.75	4.75	3.25	1.00	.....	.....	.....	[a]30.50
18-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38.35

[a] Year incomplete.

Record of precipitation at Sonora, Tuolumne County.

[Latitude, 37° 58′; longitude, 120° 22′; elevation, 1,900 feet. Authority, John Shaw.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1887–88	0.64	0	0.70	5.76	7.92	1.32	3.91	0.25	1.02	0.23	0	0	21.75
1888–89	.54	0	4.45	5.04	.88	1.75	7.22	.96	4.77	.05	0	0	25.66
1889–90	0	6.83	7.04	18.25	13.59	9.27	7.40	2.66	2.35	0	0	0	67.39
1890–91	1.69	.09	.10	10.23	1.74	9.60	3.79	3.77	.60	.68	0	0	32.29
1891–92	.36	.37	.08	9.10	1.69	4.20	6.40	2.93	5.18	.09	0	0	30.40
1892–93	.38	1.88	10.28	6.52	4.88	5.93	11.11	2.51	.27	0	0	T.	43.76
1893–94	.53	.35	3.39	3.87	8.76	11.46	2.39	1.32	3.96	1.48	T.	0.02	37.53
1894–95	1.21	4.74	0	14.53	11.19	4.62	4.01	3.25	2.40	0	0	0	45.95
1895–96	.61	.21	.75	2.51	10.80	.49	5.00	8.65	1.14	0	0.40	.61	31.17
1896–97	.25	2.85	6.74	3.97	3.31	11.89	8.37	.29	.25	.31	0	0	38.23
1897–98	.10	3.35	2.15	2.53	1.71	5.79	1.96	.60	2.70	.15	0	0	21.04
1898–99	.87	.84	1.51	2.64	6.99	.42	14.03	1.08	2.18	2.17	0	.08	32.81
1899–1900	0	6.90	7.02	5.38	3.20	1.37	2.75	4.28	2.01	.20	0	.03	33.14
1900–1901	.14	5.10	10.29	2.05	9.04	12.89	1.26	4.73	1.18	.07	0	.04	46.79
1901–2	2.42	1.81	3.15	2.40	1.35	7.86	5.53	2.45	1.44	0	0	.01	28.42
15-year mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35.76

Record of precipitation at Frazier mine, Ventura County.

[Latitude, 34° 45′; longitude, 118° 00′; elevation, 8,000 feet. Authority, Harry C. Porter.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1894–95	------	------	------	------	------	------	------	------	0.40	0	0	0	[a]0.40
1895–96	0	0.30	0.90	0.68	2.94	0	3.12	2.22	1.03	0	0.15	3.73	15.07
1896–97	0	1.47	.73	4.07	7.37	6.33	4.05	.16	.28	0	.02	.48	24.96
1897–98	0.33	1.00	T.	1.35	------	------	------	------	------	------	------	------	[a]2.68
1898–99	------	------	------	------	------	------	------	------	------	0.60	0	------	[a].60
2-year mean	------	------	------	------	------	------	------	------	------	------	------	------	20.02

[a] Year incomplete.

Record of precipitation at Mutah Flat, Ventura County.

[Latitude, 34° 38′; longitude, 119° 03′; elevation, 4,850 feet. Authority, Burt Snedden Griffen.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1893–94	0.22	1.70	0	4.10	0.54	1.41	0.30	0.13	0.79	0	0	0	9.19
1894–95	0	.85	0	7.33	9.80	.78	2.95	0	0	0	0	0	21.71
1895–96	0	.65	1.60	1.10	4.58	0	4.79	3.50	.52	0	0.30	0	17.04
1896–97	0	1.75	1.50	2.80	9.10	3.50	3.59	0	0	0	.30	0	22.54
1897–98	0	1.75	0	.15	.60	1.00	.80	0	.60	0.40	0	0	5.30
1898–99	1.80	0	0	.30	2.25	0	2.50	.50	0	0	0	0	7.35
1899–1900	0	2.00	1.30	2.25	2.80	0	1.95	.40	1.80	0	0	0	12.50
1900–1901	0	0	5.10	0	7.00	4.60	.25	1.10	.58	0	0	0	18.63
1901–2	0	2.85	.65	0	.75	3.23	2.80	1.41	0	0	0	0	11.69
9-year mean	------	------	------	------	------	------	------	------	------	------	------	------	13.99

Record of precipitation at Nordhoff, Ventura County.

[Latitude, 34° 27′; longitude, 119° 08′; elevation, 1,200 feet. Authority, R. Robinson, J. W. Wolf, and H. Lathrop.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1886–87	0	0.36	1.10	0.78	0.22	16.81	0.44	1.88	0.18	------	------	------	[a]21.77
1887–88	------	------	1.63	5.29	7.46	1.28	5.47	.54	.26	------	------	------	[a]21.93
1888–89	------	0	5.96	7.22	0	------	------	------	------	------	------	------	[a]13.18
1890–91	------	------	------	------	------	------	------	------	------	------	0	0	[a]0
91–92	0.25	0	T.	2.58	.67	2.75	3.68	.47	1.39	0	0	0	11.79
1892–93	0	1.08	1.35	8.75	5.80	3.64	7.75	.45	T.	0	0	0	28.82
1893–94	0	.61	T.	3.45	.68	.74	.29	.19	.97	0	0.03	0	6.96
1894–95	.03	.45	0	6.39	8.61	.46	3.66	.39	0	0	0	0	19.99
1895–96	0	.10	1.09	0	5.78	0	3.42	1.72	0	0	.22	T.	12.33
1896–97	0	1.38	1.03	3.00	4.11	7.16	2.91	0	0	0	0	0	19.59
1897–98	------	------	------	------	------	------	.43	0	------	0	0	0	[a].43
1898–99	0	.13	------	------	3.98	------	2.71	.27	0	0	------	0	[a]7.09
1899–1900	------	------	------	------	------	------	------	------	------	------	------	------	17.13
1900–1901	------	------	------	------	------	------	------	------	------	------	------	------	36.37
1901–2	.25	4.38	1.25	0	1.37	5.50	4.13	2.50	0	0	0	0	19.38
9-year mean	------	------	------	------	------	------	------	------	------	------	------	------	19.15

[a] Year incomplete.

Record of precipitation at Smith's ranch, Ventura County.

[Latitude, 34° 44′; longitude, 118° 47′; elevation, 4,000 feet. Authority, William Smith, Gorman Station.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1898–99	------	------	------	------	0.82	1.00	1.45	0	0	0	0	0	[a]3.27
1899–1900	0	0.95	0.65	0.35	1.20	0	1.12	0.12	0.75	0	0	0	5.14
1900–1901	0.15	0	3.10	0	2.35	2.25	.10	.32	.45	0	0	0.95	9.67
1901–2	.10	.25	.20	0	------	------	------	------	------	------	------	------	[a].55
2-year mean	------	------	------	------	------	------	------	------	------	------	------	------	7.41

[a] Year incomplete.

Record of precipitation at Snedden's ranch, Ventura County.

[Latitude, 34° 41′; longitude, 119° 03′; elevation, 4,900 feet. Authority, Burt Snedden Griffin.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1892–93	------	------	------	------	------	------	------	------	------	------	0.14	0.02	[a]0.16
1893–94	0.03	0.72	0	4.45	1.31	0.65	0.45	0.16	0.75	0	0	1.15	9.67
1894–95	.75	0	0	6.99	6.31	.49	1.50	.11	0	0	0	0	16.15
1895–96	0	.16	0.91	.55	3.47	0	5.02	3.79	.57	0	.25	T.	14.72
1896–97	.33	1.10	1.35	2.40	8.30	2.92	2.71	.02	0	0	.25	.20	19.58
1897–98	.14	.70	0	.05	.60	.41	.65	0	.54	0.35	0	0	3.44
1898–99	1.75	0	0	.30	2.65	0	1.50	.50	0	0	0	0	6.70
1899–1900	0	1.50	.47	.27	1.40	T.	1.45	.50	1.40	0	0	0	6.99
1900–1901	0	0	4.52	0	3.70	3.80	.10	1.10	.47	0	0	0	13.69
1901–2	0	1.75	1.75	0	.56	2.95	1.85	.50	0	0	0	0	9.36
9-year mean	------	------	------	------	------	------	------	------	------	------	------	------	11.14

[a] Year incomplete.

Record of precipitation at Upper Lake, Ventura County.

[Latitude, 34° 41′; longitude, 119° 03′; elevation, 4,900 feet. Authority, U. S. Weather Bureau.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1890–91	------	------	------	------	------	------	------	------	------	------	------	0	[a]0
1891–92	0.95	0.62	0.71	7.35	3.93	2.50	3.18	2.84	3.71	0.49	0	0	26.28
1892–93	T.	1.17	3.50	5.30	4.08	5.19	5.47	2.37	1.04	0	T.	0	28.12
1893–94	.85	.47	4.83	2.82	10.43	6.21	1.80	1.46	1.02	1.12	0	T.	31.01
1894–95	.53	2.05	1.13	11.62	14.92	4.15	3.20	1.41	1.39	0	0.05	T.	40.45
1895–96	.46	T.	3.50	5.30	11.18	.80	2.39	6.01	2.07	0	T.	0.87	32.58
1896–97	.42	1.04	5.07	6.47	3.45	6.35	4.58	.42	.22	.97	.05	0	29.04
1897–98	.08	1.67	2.38	2.61	.93	4.57	.36	.43	1.90	.58	0	T.	15.51
1898–99	.60	1.01	1.66	1.34	8.16	.25	5.59	.90	1.00	.05	0	.03	20.59
1899–1900	0	3.49	6.33	9.79	3.98	1.31	3.53	2.13	.81	.35	T.	0	31.72
1900–1901	.03	3.96	5.08	3.63	6.44	4.75	1.06	2.43	.70	0	T.	T.	28.08
1901–2	1.11	1.09	4.35	2.09	1.35	12.82	3.87	2.85	1.60	0	0	.07	31.20
11-year mean	------	------	------	------	------	------	------	------	------	------	------	------	28.60

[a] Year incomplete.

Record of precipitation at Ventura, Ventura County.

[Latitude, 34° 20′; longitude, 119° 20′; elevation, 50 feet. Authority, Mr. Saxby.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1873–74	0	0	0.50	4.50	3.75	4.75	1.00	0	0.50	0	0	0	15.00
1874–75	0	0.50	.75	0	13.75	.12	.12	0	0	0	0	0	15.24
1875–76	0	0	5.00	.25	7.75	5.75	2.25	0	0	0	0	0	21.00
1876–77	0	0	0	0	3.60	0	.50	0.37	.75	0	0	0	11.62
1877–78	0	0	3.65	0	4.10	8.51	1.45	2.26	.25	0	0	0	20.22
1878–79	0	.34	0	4.07	4.67	1.09	.23	2.14	.25	0	0	0	12.79
1879–80	0	.57	1.91	4.98	1.41	7.63	1.95	3.61	0	0	0	0	22.06
1880–81	0	.25	.84	8.19	2.47	.18	1.53	.45	0	0	0	0	13.91
1881–82	0.06	1.98	.25	.81	.60	2.79	4.20	1.23	.06	0	0	0	11.98
1882–83	0	.31	.71	.10	3.48	2.35	1.95	.18	2.41	0.02	0	0	11.51
1883–84	0	1.00	0	4.46	7.38	9.96	9.44	2.06	.13	1.70	0	0	36.13
1884–85	0	.38	.84	4.95	1.25	.23	1.58	.23	0	0	0	0	9.46
1885–86	0	.03	.33	1.03	6.16	.34	2.27	1.97	.09	0	0	0	20.22
1886–87	0	.02	.94	.64	.20	11.08	.39	1.37	.11	0	0	0	14.75
1887–88	.06	.02	2.71	2.86	8.19	1.62	4.51	.34	0	0	0	0	20.31
1888–89	0	.04	4.47	4.39	.20	1.46	5.64	0	.65	0	0	0	16.85
1889–90	0	4.45	2.85	11.04	5.01	1.85	.45	0	0	0	0	0.03	25.68
1890–91	.84	0	.40	2.69	.45	7.12	3.10	.60	.16	0	0	0	15.36
1891–92	.98	0	0	1.75	1.05	4.54	.29	0	0	0	0	0	8.61
1892–93	0	.70	2.15	5.80	3.17	3.02	7.88	.42	.40	0	0	0	23.54
1893–94	0	.85	.25	2.04	.81	.50	.27	.17	.50	0	0	0	5.39
1894–95	.95	.10	0	3.13	5.25	1.00	3.17	.47	.86	.07	0	0	15.00
22-year mean													16.35

Record of precipitation at Rumsey, Yolo County.

[Latitude, 38° 51′; longitude, 122° 14′; elevation, — feet. Authority, Pacific Railway System.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1888–89	0.80	0	6.55	5.15	0.95	1.35	8.20	1.40	2.45	0.15	0	0	27.00
1889–90	0	7.90	4.13	12.07	12.01	4.52	5.32	1.17	1.29	0	0	0	48.41
1890–91	.35	0	0	3.91	.87	13.60	1.16	1.92	1.28	0	0	0	23.09
1891–92	.85	0	.35	4.98	3.49	2.84	3.02	1.21	2.78	0	0	0	19.52
1892–93	0	1.03	10.57	11.37	4.80	5.42	5.77	1.76	.77	0	0	0	41.49
5-year mean													31.90

Record of precipitation at Colgate, Yuba County.

[Latitude, 39° 22′; longitude, 121° 10′; elevation, 650 feet.[a] Authority, Bay Counties Power Company.]

Year.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Total.
1900–1901	0	6.79	7.45	0	6.98	5.07	2.11	0	0.08	0	0	0	28.48
1901–2	1.48	3.61	4.39	5.31	1.44	18.22	4.23	4.10	.80	0	0	0	43.58
2-year mean													36.03

[a] Gage at bottom of canyon 1,000 feet deep.

INDEX.

Page.

Abbotts Ferry, stream measurements at 339
Agricultural ditch, measurements of 244
Aguilar Creek, measurements of 32, 321
Alameda Creek, measurements of 32–39
Alder Creek, measurements of 281, 364
Alhambra Water Company, stream measurements at weirs of 245
Aliso Creek, measurements of 40
Alsetrez ditch, measurements of 221, 299, 320
Alta, rainfall at 448
Alturas, rainfall at 440
Amador ditch, measurements of 168–169
American River, measurements of 40–42
American Valley, stream measurements at. 86
Anaheim, stream measurements at 320
Anaheim canal, measurements of 310
Anaheim Union canal, measurements of... 309
Angel's ditch, measurements of 339
Ant Creek, measurements of 100
Antelope Valley, stream measurements in. 402
Armas Creek, measurements of 42, 321
Armitas Creek, measurements of 42
Arroyo Burro, measurements of 43, 321
Arroyo Carnero, measurements of 43, 321
Arroyo ditch, measurements of 244
Arroyo Grande, measurements at and near 43, 123
measurements of 43
Arroyo Leon, measurements of 43
Arroyo Seco, measurements of 44–46, 202–204
Arroyo Seco (Salinas River), flood measurements of 411
Artesian Belt Company, wells of, measurements of 246
Auburn, rainfall at 355, 449
stream measurements near 42, 46
Auburndale, stream measurements at and near 309, 311, 320
Azusa, flood measurements at 411
rainfall at 434
stream measurements at and near 226–230, 231, 248–258
Azusa canal, measurements of 228
Azusa city well, measurements of 246
Baby Ruth weir, stream measurements at. 212
Bakersfield, flood measurements near 411
Bald Mountain, stream measurements south of 100
Balls Ferry, stream measurements at 199
Banning, rainfall at 456
Banta ditch, measurements of 244
Bards station, stream measurements at 199
Barstow, rainfall at 459
Bartlett Springs, rainfall at 432

Page.

Basin Creek, measurements of 100
Battle Creek, measurements of 199
Bay Counties Electric Company's flume, measurements of 409
Beams ditch, measurements of 215, 319
Bear Creek, measurements of 110, 242, 283–284
Bear River, measurements of 46, 49
Bear Valley dam, rainfall at 459
Bear Valley ditch, measurements of 406
Bear Valley headworks, measurements of Palm Spring and 407
rainfall at 355, 428
Bear Valley trail, stream measurements at foot of 406
Beardsley Water Company, stream measurements at station of 245
Bearskin Meadow, stream measurements near 110
Beaumont, rainfall at 457
Bellota, stream measurements at 54–56
Benton Mills, stream measurements at 154
Bicknel, stream measurements at 322
Bicknell station, stream measurements at.. 319
Bidwell Bar bridge, stream measurements at 81
Big Bend Tunnel, stream measurements at. 86
Big Canyon Creek, measurements of 41
Big Creek, measurements of 261
Big Meadows, stream measurements at 86
Big Rock Creek, measurements of 50
Big Spring Branch, measurements of 86
Big Tree Creek, measurements below mouth of 339
Big Walker River, measurements of 402
Bijou, Nev., measurements of ten small streams between Glen Brook and 368
Bishop Creek, rainfall at 426
Bishop road, stream measurements near... 173
Black, Mrs., weir of, stream measurements at 246
Blackburns Junction, stream measurements at 402
Blackwood Creek, measurements of 367
Blaney Meadows, stream measurements at. 261
Bloody Canyon, stream measurements at.. 173
Bloomington flume, measurements of 215, 319
Blue Canyon Creek, measurements of 160
Boca, measurements at 366
rainfall at 443
Boulder Creek, measurements of 110
Bowman dam, flood measurements of Yuba River at 410
rainfall at 444
Bradbury ranch, stream measurements at.. 244

Page.

Brannan Slough, measurements of 187
Bridal Veil Creek, measurements of 154
Bridgeport, stream measurements at and near 401, 409
Bridgeport Valley, stream measurements in. 401
Briscoe Creek, measurements of 341
Brown ditch, measurements of 341
Brundege place, stream measurements at .. 317
Bruns Creek, measurements of 64
Brush Creek, measurements of 101
Bryson, stream measurements at and near. 205
Bubbs Creek, measurements of 110
Buckeye Creek, measurements of 401
Buckeye Springs, stream measurements at. 401
Bull Run Creek, measurements of 100
Bulls Head Canyon, measurements at 71
Burnett Creek, measurements of 206
Burney Creek, measurements of 182
Burney Falls, stream measurements below. 182
Burts Ferry, stream measurements at 85
Butano Creek, measurements of 50
Butte ditch, measurements of 168
Butte Valley, stream measurements at 86
Butte Valley Creek, measurements of 86
Cache Creek, measurements of 51–53
Cajon Creek, measurements of 53
Cajon Creek Canyon, stream measurements in 318
Calabasas, rainfall at 434
Calaveras River, measurements of 53–56
Caliente, rainfall at 428
Caliente Creek, measurements of 56–59
California State engineering department, acknowledgments to 12
Calloway canal, measurements of 99–100
Cameron or Sheep Creek ditch, measurements of 244
Camp Carlton ditch, measurements of ... 215, 319
Camp Independence, rainfall at 427
Camp Mohave, stream measurements at ... 69
Camp Tabeand, stream measurements at .. 168
Camp Wright, rainfall at 439
Campers station, stream measurements at .. 243
Campo, rainfall at 463
Camulos, stream measurements 2 miles east of 323
Camulos ditch, measurements of 323
Canyada del Corral Creek, measurements of 60, 321
Canyada Lares Creek, measurements of ... 60
Canyada Llaces Creek, measurements of ... 321
Canyada Refugio Creek, measurements of. 60, 321
Canyada Verde Creek, measurements of .. 60, 321
Capitan (El) Creek, measurements of 60
Carbon Bridge, stream measurements at ... 182
Carpenteria Creek, measurements of 61, 321
Carson River, measurements of 61–64
Carson River Basin, measurements in 64
Cascade Creek, measurements of 336, 368
Castillo ditch, measurements of 309
Castle Crags, stream measurements at 199
Cate ditch, measurements of 244
Cattle Canyon, measurements of 243
Chapman ranch, stream measurements at . 244
Chapman well, stream measurements of ... 246
Chatsworth, stream measurements at 40

Page.

Cherokee, rainfall at 421
Cherokee Pipe crossing, stream measurements at 85
Cherokee reservoir, rainfall at 421
Cherry Creek, Colo., flood measurements of 410
Cherry River, measurements of 382–383
Chillie Bar, stream measurements at 41
Chino Creek, measurements of 309–310, 320
Chiquita San Joaquin River, measurements of 268
Chowchilla Creek, measurements of 65–67
Christmas Prairie, rainfall at 426
Church ditch (Fresno Canal), measurements of 110
Cisco, rainfall at 355, 450
Citizens' Water Company's well, Covina, measurements of 246
City Creek, measurements of 68, 318
Claremont, stream measurements in 317
Clark Creek, measurements of 100
Clarks Fork, measurements of 339
Clear Creek, measurements of 101
Clear Lake, evaporation at 31–32
Clements, stream measurements at 169
Clinton, stream measurements at 364
Colby's camp, rainfall at 434
Cold Creek, measurements of 363, 366
Cold Spring Canyon, measurements of 68
Cold Stream Creek, measurements of 321
Coldwater Creek, measurements of ... 69, 236–241
Coles, rainfall at 469
Colfax, rainfall at 355, 451
stream measurements near 42
Colgate, rainfall at 478
Colliers, stream measurements near 339
Collinsville, stream measurements at 188–190
Colony dam, stream measurements near ... 343
Colorado River, measurements of 69–71
Colton, measurements in canals above ... 221–225
stream measurements in vicinity of 220, 299, 307–308, 319
Colton ditch, measurements of 215
Colton Terrace Water Company, stream measurements at station of 215–216, 319
Consolidated Water Company's Pomona plant, weir of, measurements at 317
Convict Creek, measurements of 173
Copper City, stream measurements near ... 182
Copper Creek, measurements of 110
Corral Creek, measurements of 100
Cosumnes River, measurements of 72–75
Coulterville, rainfall at 439
Covina Irrigation Company, pumping plant of, stream measurements at 317
Covina, well at, measurements of 246
Cow Creek, Tuolumne County, measurements of 336
Crafton canal, measurements at headworks of 159, 162, 163
Crafton ditch, San Bernardino County, measurements at head of 286
Crafton Water Company's pumping plant, stream measurements at 319

	Page.
Crocker-Hoffman canal, measurements near	153
Crockers (Sequoia post-office), rainfall at	474
Crown Creek, measurements of	110
Crown Meadow, stream measurements near	110
Cucamonga Creek, measurements of	75, 317
Cucamonga Land and Water Company, weir of, stream measurements of	317
Currier's dam site, stream measurements above	203
Cuyamaca, rainfall at	355
Cuyamaca reservoir, rainfall at	463
run-off in watershed of	20
Daley ditch, measurements of	216, 319
See also Meeks & Daley ditch.	
Daniels & Overholtzer well, measurements of	247
Daty & Sons, well of, measurements of	246
Davis ranch, stream measurements at	95
Deacon well, measurements of	246
Deep Creek, rainfall at	459
Deer Creek, measurements of	78–81, 110, 363
Del Monte Water Company, weir of, stream measurements at	317
Del Rosa canal, measurements of	318
Delihi mine, stream measurements near	409
Delta, rainfall at	467
Democrat Springs, measurements of	101
Dering Creek, rainfall at	474
Descanso, rainfall at	355, 463
Devils Gate, stream measurements at and near	45, 186
Dinkey Creek, measurements of	110
Dinsmore Creek, measurement of	81, 321
Discharge tables, list of	32–409
Dobbins Creek, measurement of	81
Dog Valley Creek, measurements of	365
Donner Creek, measurements of	363, 365
Donner Lake, measurements near	363
Dos Pueblos Creek, measurements of	81, 321
Dotta, or Lower Big Spring Branch, measurements of	86
Douglas and McQuilly well, measurements of	247
Doyles ditch, measurements near	374
Dry or Jackson Creek, measurements of	82–84
Dry Meadows, stream measurements at	100
Duarte canal, measurements of	228
Duarte Mutual Improvement and Canal Company, stream measurements at station of	245
Dunsmuir, rainfall at	469
Durkee ditch, measurements of	300, 320
Dusy Meadows, stream measurements at	111
Dutton's, stream measurements near	181
Eaton Canyon, stream measurements in	85
East Riverside district, stream measurements in	216
East Riverside ditch, measurements of	319
East Twin Creek, measurements of	318
East Whittier ditch, measurements of	244
Eastwood, J. S., dam site of, stream measurements at	261
Eaton Wash, measurements of wells in	85
Edgewood, rainfall at	469
Edwards bridge, stream measurements near	409
El Capitan Creek, measurements of	321
El Monte Narrows, stream measurements near	243
El Monte road crossing, stream measurements at	243
Eldorado, rainfall at	422
Eldorado bridge, stream measurements at	409
Eldorado ditch, measurements of	41
Eldorado flume, measurements of	40
Eleanor Creek, measurements of	383–385
Eleanor Lake, measurements at	385
Eleanor trail crossing, measurements at	382–383
Electra, flood measurements at	411
stream measurements at	168, 173
Elevation, increased rainfall with, diagram showing	16
relation of rainfall to	355–357
Elk Creek, measurements below	341
Emerald Bay, measurements of streams between Meeks Creek and	367
Emerald Bay Creek, measurements of	367
Emigrant Gap, rainfall at	452
Enterprise, stream measurements at	86
Enterprise canal, measurements of	111
Escondido Irrigation District canal, stream measurements at head works of	274
Esperanza station, measurements opposite	310
Essex, Nev., stream measurements at	365
Eureka Lake Company's canal, measurements at	409
Eureka Valley, measurements in	337
Evans ditch, measurements of	221, 359
Evans Island ditch, measurements of	221
Evans lower ditch, Riverside County, measurements of	299
Evans upper ditch, measurements of	300, 320
Evaporation at Sweetwater reservoir	348
measurement of	20–32
methods of	23
Excelsior Mining and Irrigation canal, measurements of	409
Fall River, measurements of	182
Falls Creek, measurements of	386
Farmers ditch, measurements of	323
Farrell ditch. *See* Logsdon & Farrell ditch	217
Ficay Creek, measurements of	87
Fillmore, measurements 1 mile east of	323
Fish Fork, stream measurements near	237
Floods, measurements of	410–411
Florence, Ariz., flood measurements of Gila River at	410
Floriston, stream measurements at	364
Feather River, measurements of	85–87
Follows Camp (Azusa), rainfall at	434
Folsom, stream measurements at and near	40, 41
Fort Bidwell, rainfall at	440
Fort Crook, rainfall at	468
Fort Jones, rainfall at	470
Fort Mountain, stream measurements east of	169
Fort Tejon, rainfall at	429
Fort Tejon Creek, measurements of	87
Fosters, stream measurements near	203

Page.
Fountain of Life Spring, stream measurement at 213, 214
Fouts Springs, rainfall at 421
Fowler Switch canal, measurements of 110
Frazier mine, rainfall at 476
Freemans Bridge, Yuba River, measurements at 409
Freeport, stream measurements at 187
French House, stream measurements at 181
Fresno Creek, measurements of 88–90
Frey's ranch, stream measurements at 317
Frog Creek, measurements of 385
Fuller ditch, measurements of 311, 320
measurements above 311
Fulton, D., well of, measurements of 247
Gage canal (Santa Ana River), measurements of 216, 319
Galligers Ford, stream measurements at 308
Gardnerville, Nev., stream measurements at and near 62
Gato Creek, measurements of 91–93
Gazoo Creek, measurements of 94
General Creek, measurements of 367
Georgetown, rainfall at 423
Gila Bend, flood measurements of Gila River at 410
Gila River, Ariz., flood measurements of 410
Gilliland's ditch, measurements of 311, 320
Glassell tributary, measurements of 133
Glen Brook, Nev., measurements of ten small streams between Bijou and 368
Glen ranch, rainfall at 460
Glendora, stream measurements at 246
Goodwin Mining Company's canal, measurements at 385
Gorman Creek, measurements of 181
Gorman station, stream measurements near 181
Gould canal, measurements of 110
Granite Creek, measurements of 110, 261
Grass Valley, rainfall at 445
Graves and Bean tunnel, stream measurements at 245
Gray and Shaws, stream measurements at 187
Grease (Santa Clara) ditch, measurements of 323
Green Creek, measurements of 401
Green Spot pipe line (Santa Ana River), measurements of 284–286, 318
Grindstone Creek, measurements of 341
Gubernador Creek, measurements of 94, 321
Hackett Meadows, stream measurements at 96
Half Moon Bar, measurements near 43
Half Moon Bay, stream measurements above 181
Hall ditch, measurements of 341
Hamptonville, stream measurements at 262–264
Harris Creek, measurements of 100
Harvey's ditch, measurements of 64
Haskell well, measurements of 317
Hat Creek, measurements of 182
Hauser Brothers well, measurements of 247
Hawkins Creek, measurements of 64
Haws & Talmage ditch, measurements of 217, 319
Hays & Stratton well, measurements of 247
Hennesseys, stream measurements at 85
Herndon, flood measurements at 411
stream measurements at 259–260, 265–268
Hetch Hetchy dam site, measurements at 381, 382
Hetch Hetchy Valley, stream measurements in 381, 385
Highland, W. A., stream measurements at 244
Highlands canal, measurements of 287, 318
Hirze Mountain, stream measurements at 152
Holcomb Creek, rainfall at 460
Hollenbeck ranch, stream measurements near 207
Honey Lake, measurements of 94
Honey Lake Basin, measurements at 343, 344
Hood, William, reference to 14
Hooper ditch, measurements of 101
Hornbrook, rainfall at 470
Horse Creek, measurements of 96
Horse Meadows, stream measurements at 101
Horseshoe Bend, stream measurements at 154
Hot Springs, stream measurements at 101
House Creek. *See* Tejon House Creek.
Huffs Bar, stream measurements at 86
Hunter Creek, measurements of 366
Huntoon ranch, stream measurements at 401
Hydraulic Mining Company's canal, measurements of 393
Iceland, stream measurements at 364
Idlewild, measurements of streams between McKinney's and 367
Illilonette River, measurements of 154
Independence Creek, measurements of 366
Independence Lake, measurements at 366
Indian Creek, measurements of 64, 86
Indian Hill, stream measurements at 317
Indian Valley, stream measurements at 86
Iowa Hill (Strawberry Flat), rainfall at 453
Iron Canyon, stream measurements at 191–192
Iron Fork, San Gabriel River, measurements near 239–240
Isabella, rainfall at 429
stream measurements at 101
Jacinto, rainfall at 425
Jackass Creek, measurements of 261
Jackson, rainfall at 420
Jackson Creek, measurement of 82–84, 100
Jacksonville, stream measurements at 385
Jellys Ferry, flood measurements at 411
stream measurements at 193–198
Joe Gray Creek, measurements of 364
Jolon, flood measurements near 411
rainfall at 441
stream measurements at 206, 207
Julian, rainfall at 355, 464
Julian's ranch, flood measurements at 411
stream measurements at 342
rainfall at 426
Juniper Creek, measurements of 364
Jurupa canal, measurements of 306
See also North Riverside and Jurupa canal.
Kansas City Syndicate, development of, stream measurements along 318
Kaweah ditch, measurements of 95
Kaweah River, measurements of 95–99
Keeler, rainfall at 427
Keene, rainfall at 430

Page.

Keenebrook station, stream measurements at 53
Keller Creek, measurements of 289
Kern County, evaporation in Tulare County and 22–31
Kern Lake, evaporation at 25
stream measurements below 100
Kern River, evaporation at 26
flood measurements of 411
measurements of 99–109
Kern River Power Company, stream measurements above station of 101
Kernville, rainfall at 430
stream measurements near 101
Kewen Lake, stream measurements near .. 245
Killion's pumping plant, stream measurements at 244
King City, rainfall near 441
stream measurements at and near 207, 208
King River, evaporation at 27–31
flood measurements of 411
measurements of 109–119
King River Basin, rainfall in 19
Kings River Canyon, stream measurements near 110
Kingsbury; evaporation at 27–31
stream measurements at 111
Kingsbury canal, measurements of 110
Kiser well, measurements of 247
Knights Ferry, measurements near 338–340
Knights Landing, stream measurements at. 187
Kono Tayee, rainfall at 432
Kulp well, measurements of 247
La Liebre, rainfall at 435
La Verne Land and Water Co., well of, measurements of 247
Lagrange, flood measurements at 411
stream measurements at 385, 386–392
Lagrange dam, flood measurements of Tuolumne River at 410
Lagrange ditch, measurements of 393
Laguna, rainfall at 464
Lake Eleanor, stream measurements at .. 384–385
Lake Tahoe, evaporation at 20–21
measurements at outlet of 361
of streams flowing into 367–369
Lake Vernon, stream measurements at 386
Lakeport, evaporation at 31–32
rainfall at 433
Lamanda Park, stream measurements at .. 244
Lancaster, C. L., weir of, stream measurements at 317
Lancha Plana dam, measurements at 169
Laporte, rainfall at 455
Larsens, stream measurements above 402
Lathrop, stream measurements near 261
Latrobe, stream measurements at 72
Laux ditch, measurements of 341
Leavitt, stream measurements at 402
Leevining, stream measurements at 173
Liddel, Robert, weir of, stream measurements of 246
Little Bear Valley, rainfall at 460
Little Grass Valley, stream measurements at 86
Little John canal, measurements of 338

Page.

Little Kern River, measurements of 100
Little Lake, measurements at 244
Little Rock Creek, measurements of 119
Little Rock irrigation district, stream measurements in 119
Little Silver Creek, measurements of 40
Little Stony, rainfall at 422
Little Truckee River, measurements of 366
Little Walker River, measurements of 402
Live Oak Suspension Bridge, Sacramento County, stream measurements at 72–75
Lobetus Creek, measurements of 119
Lodi, stream measurements at 168
Logsdon & Farrell ditch, measurements of 217, 319
Loma Abajo, measurements of 120–123
Lone Star Mills, stream measurements at. 170–172
Lone Star Spring pumping plant, measurements at 318
Long Valley, stream measurements at 111
Lopez Creek, measurements of 123
Lordsburg, stream measurements at 317
Lordsburg Mesa, stream measurements on. 247
Los Angeles, rainfall at 355, 435
Los Angeles River, measurements of 123–137
Los Flores Canyon, stream measurements in 137–138
Los Ojitos dam site, stream measurements at 206
Los Robles Water Company's reservoir, measurements in 245
Lougherydam site, stream measurements at. 46
Lower Lake, stream measurements at 52–53
Lower Murphy ditch, measurements of 101
Lower Piru Creek, measurements of 181
Lower Stafford ditch, measurements of 101
Lower Tule canal, measurements of 376
Lundy Lake, stream measurements near ... 173
Lytle Creek, measurements of 139, 148, 318
Lytle Creek canal, measurements of 141–146
McCloud River, measurements of 152
McFarlands Bridge, measurements at 375, 380
McIntyre ditch, measurements of 217, 319
McKenzie ditch, measurements of 217, 319
McKinney Creek, measurements of 367
McKinneys, measurement of streams between Idlewild and 367
Magic Hill, No. 1, rainfall at 436
Main River, measurements of 41
Main Silver Creek, measurements of 41
Malakoff mine, rainfall at 445
Mammoth Creek, measurements of 173
Manache Meadows, stream measurements at 99, 100
Manzana, rainfall at 436
Maria Ignacia Creek, measurements of ... 148, 321
Mariposa Creek, measurements of 149–151
Martis Creek, measurements of 364
Marysville, stream measurements at 85, 407
stream measurements between Smartsville and 407
Mas. C. and M. Company's dam, measurements at 154
Massey wells, stream measurements of ... 246–247
Matthews ranch, rainfall at 441

Page.

Matthews ranch, stream measurements near 207
Mayberry Canyon, measurements in..... 152
Meeks & Daley ditch, measurements of.... 319
Meeks Creek, measurements of streams between Emerald Bay and 367
Meiggs Creek, measurements of..... 367
Mendota, stream measurements at..... 261
Merced Falls, stream measurements at and near 153, 155–157, 158
Merced River, measurements of..... 152–158
Merced River Mills canal, measurements of. 153
Middletown, rainfall at 433
Mill Creek "A," rainfall at 460
Mill Creek "B," rainfall at 461
Mill Creek, measurements of..... 111, 173, 318, 337
Mill Creek (Santa Ana River), measurements of..... 158–163
Mill Creek, measurements of, at junction Love and Morgan creeks..... 339
Miller & Lux canal, measurements of 261
Miller Bridge, stream measurements near . 261
Millers Narrows, stream measurements at. 147–148
Milo, rainfall at 473
Milton, measurements near 208
Mission ditch, measurements of..... 246
Mission Creek, measurements of 163, 321
Modesto, stream measurements at 396–399
Mohave River, measurements of..... 164–167
meteorologic and hydrographic work at. 20
Mokelumne ditch, measurements of 169
Mokelumne Hill, stream measurements at..... 168–169
Mokelumne River, flood measurements of . 411
measurements of 168–173
Mono Creek, measurements of 261, 326–327
Mono Lake drainage basin, measurements in 173
Mono tributary, measurements of Santa Ynez River above junction with..... 325–326
Monrovia Canyon, stream measurements at 245
Monrovia Water Company, stream measurements at weir of..... 245
Montague, rainfall at 470
stream measurements south of 328
Monte Vista canal, measurements at headworks of 137
Moorwaw & Son, well of, measurements of. 247
Morengo Canyon, stream measurements at weir in 245
Morengo Water Company, stream measurements at weir of..... 245
Mormon Canyon, flood measurements of .. 410
Morningside ranch, weir of, stream measurements at 246
Morton Canyon, stream measurements at.. 318
Morton Canyon Water, measurements of... 290
Mount Breckenridge, rainfall at 431
Mount Diablo, rainfall at 422
Mount Diablo meridian, stream measurements at..... 101
Mount Hamilton (Lick Observatory), rainfall at..... 467
Mount Lowe (Echo Mountain post-office), rainfall at 436

Page.

Mount Sister Elsie, rainfall at..... 436
Mount Whitney Power Company flume, measurements at 96
Mount Whitney power plant, stream measurements near..... 95
Mountain districts, gages used 14
Mountain Home, rainfall at..... 473
stream measurements at 160–161
Mullard well, stream measurements of 247
Mumford Hill, rainfall at 456
Mutah Flat, rainfall at..... 476
Myers ditch, measurements of 95
Nacimiento Creek, measurements of..... 205
Nameless Mining Company's dam, measurements of..... 154
Narrows flume, stream measurements at... 243
Natoma ditch, measurements of 40
Needles Peak, stream measurements at 100
Neil's ditch, measurements of..... 101
Nellie, rainfall at..... 464
Nelson Creek, measurements of..... 86
Nelson's, stream measurements between Indian reservation and 375
Neuruff, stream measurements at..... 317
Nevada City, rainfall at..... 446
New Deal Water Company, well of, measurements of 247
Newberry ditch, measurements of 311, 320
Newberry's east line (Santa Ana River), measurements of 311
Newell, F. H., letter of transmittal by 9
Newhall, rainfall at..... 437
Newhall ditch, measurements of..... 322
Newhall ranch, measurements on..... 322
Newton ditch, measurements of 311
Niagara Creek, measurements of..... 337
measurements near mouth of..... 337
Nigger Hill ditch, measurements of..... 41
Niles dam, measurements at 34–39
Nordhoff, rainfall at..... 476
Norris well, stream measurements of..... 247
North Bloomfield, rainfall at..... 447
North Bloomfield ditch, measurements of . 409
North Columbia, stream measurements at . 409
North Fork canal, measurements of..... 42
North Needles Creek, measurements of 100
North Riverside and Jurupa canal, measurements of 319, 320
Oak Knoll Park, stream measurements at.. 245
Oakdale, flood measurements at 411
stream measurements at..... 329–330, 331–336
Oakdale canal, measurements at flume near 338
Oakdale Ditch Company's flume, measurements at 338
Old Mill Valley ditch, measurements of ... 153
Old Mission, stream measurements near ... 244
Old Temple ditch, measurements of 244
One-mile Creek, measurements of..... 100
Ontario, stream measurements at 78
Orland ditch, measurements of 341
Oroville, stream measurements at..... 85–87
Owens River, measurements of 173
Pacific Improvement Company's tunnel, stream measurements at 43
Pacoima, stream measurements at 137
Padaro Creek, measurements of..... 174, 321

Page.

Paine well, measurements of..... 246
Pala, stream measurements east of..... 274
Palermo canal, south fork, measurements of..... 86
Pallett tributary, measurements on..... 50
Palm avenue weir, stream measurements of..... 216–217
Palm Spring, measurements of Bear Valley and..... 407
Palm Valley, measurements in..... 328
Palmdale (headworks), rainfall at..... 437
Panama Slough, evaporation at..... 25
Parker Creek, measurements of..... 173
Parks Bar bridge, Smartsville, measurements below..... 408
Parrots Ferry, measurements at..... 330, 339
Pasadena, stream measurements at..... 245
well near, location of..... 175
Pasadena Mesa, underground water obtained from..... 174–180
Pasadena weir, measurements of..... 245
Pastoria Creek, measurements of..... 180
Patton tunnel, stream measurements at... 245
Pattons East Canyon, stream measurements in..... 245
Pecks bridge, stream measurements at..... 182
Pescadero Creek, measurements above..... 50
measurements of..... 181
Pescadero, stream measurements 6 miles above..... 181
Petersons Creek, measurements of..... 64
Phillips's ranch, stream measurements at.. 317
Pierce's camp, stream measurements at.... 210
Pilarcitos Creek, measurements of..... 181
Pinkerton dam site, stream measurements at..... 206
Pioneer canal, measurements of..... 374–376
Piru City, stream measurements at..... 181
Piru Creek, measurements of..... 181
Piru pipe line, stream measurements at head of..... 181
Pit River, measurements of..... 182
measurements of tributary of..... 182
Placerville, rainfall at..... 424
stream measurements 3 miles from..... 41
Placitas road, stream measurements above.. 61
Pleasant Valley, stream measurements at.. 409
Plunge Creek, measurements of..... 182, 318
Pogues upper ditch, measurements of..... 95
Pollasky, stream measurements at..... 261
Pollasky Bridge, stream measurements near 261
Pollasky Ford, stream measurements at... 261
Pomona, stream measurements at..... 317
Pomona College, stream measurements near 317
Pomona Land and Water Company, weir of, measurements of..... 377
Pomponio Creek, measurements of..... 182
Portal, stream measurements at..... 68
Porterville, rainfall at..... 474
stream measurements at and near..... 374, 375, 376, 377–379
Poso Creek, measurements of..... 183–185
Poway, rainfall at..... 355
Powers ditch, measurements of..... 101
Prattville, stream measurements near..... 86
Precipitation, increase of with altitude .. 353–355

Page.

Priests Valley, rainfall at..... 441
Prosser Creek, measurements of..... 366
Puente ditch, measurements of..... 243
Purissima, stream measurements above.... 185
Purissima Creek, measurements of..... 185
Putah Creek, measurements of..... 186
Quinton Creek, measurements of..... 402
Rabel ditch, measurements of..... 319
Rabel dam ditch, measurements of..... 218
Rainfall at Sweetwater reservoir..... 348
diagrams and tables showing..... 14–17
records of..... 13
relation of elevation to..... 352–357
relation of run-off to..... 14–20
tables showing amount of..... 420–478
Rancheria Creek, measurements of..... 382
Ranchero ditch, measurements of..... 218, 319
Rancho del Jurupa, rainfall at..... 461
Ravencrofts, stream measurements near... 343
Red Bluff, stream measurements at..... 191
Red Hill, stream measurements at and near..... 76–78, 317
Red Mountain, flood measurements at..... 411
stream measurements at..... 111–112, 116–119
Redding, rainfall at..... 468
Redlands, rainfall at..... 461
Redlands canal, measurements of..... 318
Redlands or Bolen tunnel, measurements of..... 291
Redlands or South Fork (Santa Ana River), measurements of..... 290–291
Redlands tunnel, stream measurements at. 318
Redlands Power Company, stream measurements at intake of..... 161
Reeder Lake, evaporation at..... 24
Reedley, stream measurements north of... 111
Remamettes, stream measurements at..... 245
Reno, Nev., evaporation at..... 21–22
rainfall at..... 355
Rhinedollar Lake, stream measurements near..... 173
Rialto, stream measurements above..... 141–146
Richards, wells of, stream measurements of. 247
Richfield station, stream measurements at. 341
Rincon, stream measurements at and near. 309–313, 314, 315–316, 320
Rincon Creek, measurements of..... 186, 321
Rincon ditch, measurements of..... 244
Rings station, rainfall at..... 462
Rio Bravo ranch, evaporation at..... 26
stream measurements at..... 102–105
Rio Honda or Old San Gabriel, measurements of..... 244
Riverside, stream measurements in vicinity of..... 215–220, 299, 307–308
Riverside County line, stream measurements at..... 221
Riverside Mesa, stream measurements above..... 319
Riverside Narrows, stream measurements at and near..... 221, 309, 314–315, 320
Riverside Water Company, lower canal of, measurements of..... 307, 319, 320
mill flume of, stream measurements at. 319

Page.
Riverside Water Company, mill pump of, measurements of 319
station of, stream measurements at .. 218–219
upper canal of, measurements of. 220, 307, 319
Riverton, stream measurements at 40
Roaring Creek, measurements of 110
Roberts ditch, measurements of 315
Robinson Creek, measurements of 401
Robertson mill, stream measurements at ... 181
Robinsons Ferry, stream measurements at. 339
Rockford bridge, stream measurements at. 374
Rodgers well, measurements of 247
Rodney Soper well, measurements of 247
Rodriguez ditch, measurements of 244
Rogers pumping plant, stream measurements at 221
Roubidoux canal, measurements of 221
Roubidoux ditch, measurements of .. 307, 319–320
measurements of Santa Ana River below 306
Rubicon River, measurements near 42
Ruddock well, measurements of 246
Rumsey, rainfall at 478
stream measurements at 52
Run-off, relation of rainfall to 14–20
relations of rainfall to, diagrams and tables showing 14–17
table for converting depth of, in inches, into acre-feet per square mile .. 15
Rush Creek, measurements of 173
Rutherford & Co., well of, measurements of 247
Sacramento, rainfall at 355, 458
stream measurements at 41, 187, 199
Sacramento River, flood measurements of . 411
measurements of 186–199
rainfall in basin of 17–18
Sacramento Slough, measurements of 187
Salina Valley Water Companys Arroyo Seco ditch No. 2, measurements below headgate of 203
Salinas, rainfall at 442
stream measurements near 200–201
Salinas River, measurements of 199–208
tributaries of, measurements of 202–208
Salmon Creek, measurements of 100–101
Salmon Falls, measurements near 40–41
Salt River, Ariz., flood measurements of ... 410
Salt Springs Valley, rainfall and run-off in. 18–19
stream measurements in 208
San Andreas, stream measurements at 53
San Antonio Canyon, stream measurements in 317
San Antonio Creek, measurements of 206, 209–214, 339
San Antonio River, flood measurements of. 411
utilization of 211–212
San Antonio tunnel, stream measurements at 214
San Antonio Water Company's wells, stream measurements at 317
San Ardo, rainfall at 442
San Bernardino, stream measurements near 215–221
San Bernardino Valley, stream measurements in 215–225
San Diego, rainfall at 355, 465
San Diemas Canyon, well in, measurements of 246
San Diemas Irrigation Company, well of, measurements of 246
San Diemas Wash, wells in, measurements of 246
San Fernando, rainfall at 438
San Fernando Creek, measurements of 225
San Fernando Valley, measurements at 40
San Francisquito Creek, measurements of .. 225
San Gabriel Electric Company, stream measurements at power house of 214
San Gabriel Power Company, Los Angeles County, measurements at intake of 228, 231–233
San Gabriel River, flood measurements of .. 411
measurements of 225–258
San Gabriel Sanitarium tunnel, stream measurements at 244
San Gorgonio Pass, rainfall at 457
San Gregorio Creek, measurements of 259
San Joaquin River, flood measurements of . 411
measurements of 259–268
San Joaquin Electric Company, power house of, stream measurements at 261
San Joaquin River Basin, rainfall in 19
San Jose Creek, measurements of 268–274, 321
San Lorenzo Creek, measurements of 207
San Lorenzo River, flood measurements of . 411
San Luis Rey River, measurements of 274
San Mateo Creek, measurements of 275–276
rainfall and run-off in basin of 18
San Migulito ranch, measurements at 205
San Pedro Creek, measurements of 321–322
San Roqui Creek, measurements of ... 43, 276–279
San Timoteo Canyon ditch, measurements of 319
San Timoteo Creek, measurements of 322
San Ysidro Creek, measurements of 322
Sand Box, measurements at 290–291
Santa Ana, stream measurements at 320
Santa Ana canal, measurements below 318
measurements of 292–293, 310
Santa Ana Canyon, rainfall at 462
Santa Ana River, flood measurements of ... 411
measurements in basin of 317–320
measurements of 221, 279–320
Santa Ana River flume, measurements at .. 221
Santa Ana Valley Irrigation Company's canal, measurements of 316
Santa Anita Canyon, stream measurements of 245
Santa Barbara, rainfall at 466
stream measurements near 321
Santa Barbara County, stream measurements in 60–61, 321–322
Santa Clara River, measurements of 322–323
Santa Lucia, stream measurements near ... 203
Santa Monica Creek, measurements of ... 321, 323
Santa Paula, measurements near 323–324
Santa Paula River, measurements of 324
Santa Ynez River, measurements of 324–327
Sawpit Creek, measurements of 328
Scott Valley, rainfall at 471
Scoville, R. W., weir of, measurements at .. 246

Page.
Second Garotte, rainfall at ... 475
Seecher ditch, measurements of ... 316
Sequoia National Park line, stream measurements near ... 95-96
Sespe Creek, measurements of ... 328
Sespe Land and Water Company canal, measurements at head of ... 328
'Seventy-six canal, measurements of ... 110
'Seventy-six ditch, measurements of ... 112
Shasta River, measurements of ... 328
Shay ditch, measurements of ... 319
Shay or Stout dam ditch, measurements of ... 219
Sheldon Bros. well, measurements of ... 247
Shingle Springs, rainfall at ... 425
Shorbes ranch, stream measurements at ... 246
Shot Gun, measurements north of ... 337
Sierra Madre Water Company, stream measurements at weir of ... 245
Signal Service and Weather Bureau, records of ... 13
Silver Creek, measurements of ... 40, 41, 402
Silver Lake, stream measurements near ... 173
Silverthorn Ferry, stream measurements at ... 182
Simpson Meadow, stream measurements at ... 110
Sims, rainfall at ... 468
Sissons, rainfall at ... 471
Slate Point, stream measurements at ... 113-115
Sleider well, stream measurements of ... 247
Smartsville, stream measurements at and near ... 407, 408
Smith, F. D., well of, measurements of ... 246
Smith's, stream measurements at ... 181
Smith's ranch, rainfall at ... 477
Snedden's ranch, rainfall at ... 477
Snelling, stream measurements below ... 153
Snelling ditch, measurements of ... 153
Snow Creek, measurements of ... 328
Soda Creek, measurements of ... 199
Soldiers' Camp, stream measurements below trail from Tar Gap to ... 95
Somers, stream measurements at ... 401
Sonora, rainfall at ... 475
South Antelope Valley Water Company, stream measurements at headworks of ... 119
South Needles Creek, measurements of ... 100
South Yuba Water Company, canal of, measurement of ... 42
ditch of, measurements of ... 46
Southern Pacific Railroad, records of ... 14
Spadra, stream measurements near ... 317
Spanish Creek, measurements of ... 86
Spark's well, stream measurements of ... 246
Spring Brook, stream measurements at ... 308, 320
Spring Hill weir, stream measurements at ... 214
Squaw Creek, measurements of ... 182, 363, 365
Squirrel Inn, rainfall at ... 462
Stafford and Neal ditch, measurements of ... 101
Standard dam, stream measurements near ... 401
Standard ditch, measurements of ... 339
Standard Power Canal, measurements of ... 169
Standifer ditch, measurements of ... 244
Stanislaus River, flood measurements of ... 411
measurements of ... 329-340
rainfall in basin of ... 19
Stanislaus Water Company's Canal, measurements of ... 338-340
Steves well, measurements of ... 247
Stones Ferry, stream measurements at ... 69
Stony Creek, flood measurements of ... 411
measurements of ... 340-342
rainfall on ... 426
Stony Ford ditch, measurements of ... 341
Stowell, stream measurements at ... 78
Stream measurements, methods of ... 11
record of ... 11-12
Sugar Pine, stream measurements at ... 340
Summit, rainfall at ... 355, 454
Sumner well, measurements of ... 247
Susan River, measurements of ... 343-344
Susanville, rainfall at ... 433
stream measurements near ... 343
Sutter Creek, measurements of ... 344
Sutter River, measurements of ... 344
Swamp ditch, measurements of ... 219, 319
Sweetwater, rainfall at ... 355
Sweetwater Basin, evaporation in ... 22, 352
rainfall in ... 346-347
run-off from ... 347
Sweetwater reservoir, evaporation at ... 22
evaporation and run-off in basin of ... 20
measurements at ... 348-350
Sweetwater River, floods in ... 352-353, 410
measurements of ... 344-357
Sycamore Flat, stream measurements at ... 233-234
Tahoe, measurements at ... 360-361, 362
evaporation at ... 21
Tahoe tollgate, measurements of creek near ... 365
Talmage ditch, measurements of Haws and ... 217
Tamarack, rainfall at ... 420
Tanners slough, measurements at ... 344
Taylor Creek, measurements of ... 368
Tecolote Creek, measurements of ... 321, 357
Tehachapai, rainfall at ... 431
Tehipiti, stream measurements at ... 111
Tejon Creek. *See* Fort Tejon Creek.
Tejon House Creek, measurements of ... 357
Tejon ranch, rainfall at ... 432
Tejon ranch house, measurements at ... 357
Temescal, stream measurements at ... 358-359
Temescal Creek, measurements of ... 358-359
Temple ditch, measurements of ... 243
Tenaya River, measurements of ... 154
Tenmile Creek, measurements below ... 111
Thacker well, measurements of ... 246
Thomas Creek, measurements of ... 341
Three Rivers, stream measurements 3 miles above ... 96
Tibbetts Creek, measurements of ... 100
Tiltill Creek, measurements of ... 385
Timber ditch, measurements of ... 319
Tobias Creek, measurements of ... 100
Toro Canyon, measurements of ... 360
Towles, rainfall at ... 455
Townsend ditch, measurements of ... 316, 320
Trabuco Creek, measurements of ... 360
Trail Crossing, stream measurements at ... 261
Trimmer Springs, measurements of ... 110-111
Truckee, measurements below ... 361
rainfall at ... 355, 448

Page.

Truckee River, measurements of..... 360–373
tributaries of, measurements of..... 363–366
True well, stream measurements of 247
Trujillo ditch, measurements of..... 308, 319–320
measurements of Santa Ana River below 306
Tujunga, stream measurements at..... 137
Tujunga Railroad, stream measurements along 137
Tulare County, evaporation in Kern County and 22–31
Tulare Lake, measurements at..... 376
Tule River, measurements of..... 374–380
Tumitus Creek, measurements of..... 380
Tunis Creek, measurements of 381
Tuolumne Meadows, stream measurements at 385
Tuolumne River, flood measurements of... 411
measurements of 381–399, 410
rainfall in basin of 19
Turlock canal, measurements of 385, 394–395
Twin Creeks, measurements of..... 400–401
Twin Lakes, stream measurements at..... 401
United States fishery, stream measurements at..... 152
Upper Holcomb Valley, rainfall at..... 462
Upper Lake, rainfall at..... 477
Upper Truckee River, measurements of.... 368
Ventura, rainfall at 478
Verdi, stream measurements at 365
Victorville, stream measurements at 166–167
Victorville Narrows, stream measurements at..... 164–165
Vineland canal, measurements of..... 227
Vineland tunnel, stream measurements at 226, 231
Virginia Creek, measurements of 401
Vista, Nev., measurements at 370–373
Wachumna Hill, stream measurements at. 96–99
Wade Creek, measurements of 100
Wadsworth, rainfall at..... 355
Walker Creek, measurements of..... 173
Walker River, measurements of..... 401–402
Walkers Basin, stream measurements in ... 100
Walkers well, stream measurements of..... 246
Walla Walla Creek, rainfall at..... 472
Wallace well, measurements of 247
Ward & Warren ditch, measurements of . 219, 319
Ward Creek, measurements of..... 367
Ward's ferry, stream measurements at..... 385

Page.

Warm Spring, flood measurements at 411
stream measurements at 293–299, 300–305
Warners, rainfall at 466
Watumna Canal, measurements of..... 95
Wawona, stream measurements at..... 154
Weaverville, rainfall at 473
Weir, tables showing measurements of .. 412–419
Weldon, rainfall at Taylor's ranch..... 431
stream measurements at 101
Welton ditch, measurements at head-gate of..... 341
West Branch, measurements of 80
West Point, stream measurements near.... 169
West Riverside bridge, stream measurements near 308, 320
West Riverside pumping plant, stream measurements at 221
West Twin Creek, measurements of..... 318
Wheatland, stream measurements at 46
Wheaton ranch, stream measurements near. 375
White Creek, measurements of..... 403–406
Whitewater, rainfall at 457
Whitewater River, measurements of..... 406–407
Whiting ditch, measurements of..... 219–220, 319
Whitlock ditch, measurements of..... 220, 319
Whitney Creek, measurements of..... 100
Whittier ditch, measurements of..... 243
Wilbur ditch, measurements of 316
William well, measurements of 247
Williams River, Arizona, measurements of..... 50
Willow Creek, measurements of..... 343
Winston ranch, stream measurements at .. 246
Winters, stream measurements above..... 186
Woodbridge, stream measurements at 169
Woodbridge canal, measurements of..... 169
Woodfords, stream measurements at and near 63, 64
Yankee Hill Bridge, stream measurements at..... 86
Yoakham's ranch, stream measurements at 246
Yorba ditch, measurements of 316
Yosemite, rainfall at 439
Yosemite Valley, stream measurements in..... 153–154
Yreka, rainfall at 472
Yuba River, measurements of..... 407–409
South Fork, flood measurements of 410
Yuma, Ariz., stream measurements at and near 50, 69–71

O

LIBRARY CATALOGUE SLIPS.

[Mount each slip upon a separate card, placing the subject at the top of the second slip. The name of the series should not be repeated on the series card, but the additional numbers should be added as received to the first entry.]

Author.

Lippincott, Joseph Barlow.

. . . California hydrography, by Joseph Barlow Lippincott. Washington, Gov't print. off., 1903.

488 p., 1 l. 1 pl. (map), fig. 23½cm. (U. S. Geological survey. Water-supply and irrigation paper no. 81.)
Subject series M, General hydrographic investigations, 5.

Subject.

Lippincott, Joseph Barlow.

. . . California hydrography, by Joseph Barlow Lippincott. Washington, Gov't print. off., 1903.

488 p., 1 l. 1 pl. (map), fig. 23½cm. (U. S. Geological survey. Water-supply and irrigation paper no. 81.)
Subject series M, General hydrographic investigations, 5.

Series.

U. S. Geological survey.

Water supply and irrigation papers
no. 81. Lippincott, J. B. California hydrography. 1903.

Reference.

U. S. Dept. of the Interior.

see also

U. S. Geological survey.

SEP 25 1903

Series L—Quality of Water.

WS 3. Sewage irrigation, by George W. Rafter. 1897. 100 pp., 4 pls.
WS 22. Sewage irrigation, Part II, by George W. Rafter. 1899. 100 pp., 7 pls.
WS 72. Water pollution of metropolitan areas, by M. O. Leighton. 1902. 75 pp., 8 pls.
WS 76. Observations on the flow of rivers in the vicinity of New York City, by H. A. Pressey. 1902. 108 pp., 13 pls.
WS 79. Normal and polluted waters in Northeastern United States, by M. O. Leighton. 1903. 192 pp., 17 pls.

Series M—General Hydrographic Investigations.

[See last page of this cover.]

Series N—Water Power.

WS 24. Water resources of State of New York, Pt. I, by G. W. Rafter. 1899. 99 pp., 13 pls.
WS 25. Water resources of State of New York, Pt. II, by G. W. Rafter. 1899. 100-200 pp., 12 pls.
WS 44. Profiles of rivers, by Henry Gannett. 1901. 100 pp., 11 pls.
WS 62. Hydrography of the Southern Appalachian Mountain region, Pt. I, by H. A. Pressey. 1902. 95 pp., 25 pls.
WS 63. Hydrography of the Southern Appalachian Mountain region, Pt. II, by H. A. Pressey. 1902. 96-190 pp., 26-44 pls.
WS 69. Water powers of the State of Maine, by H. A. Pressey. 1902. 124 pp., 14 pls.

Series O—Underground Waters.

WS 4. A reconnaissance in southeastern Washington, by Israel C. Russell. 1897. 96 pp., 7 pls.
WS 6. Underground waters of southwestern Kansas, by Erasmus Haworth. 1897. 65 pp., 12 pls.
WS 7. Seepage waters of northern Utah, by Samuel Fortier. 1897. 50 pp., 3 pls.
WS 12. Underground waters of southeastern Nebraska, by N. H. Darton. 1898. 56 pp., 21 pls.
WS 21. Wells of northern Indiana, by Frank Leverett. 1899. 82 pp., 2 pls.
WS 26. Wells of southern Indiana (continuation of No. 21), by Frank Leverett. 1899. 64 pp.
WS 30. Water resources of the lower peninsula of Michigan, by A. C. Lane. 1899. 97 pp., 7 pls.
WS 31. Lower Michigan mineral waters, by A. C. Lane. 1899. 97 pp., 4 pls.
WS 34. Geology and water resources of a portion of southeastern South Dakota, by J. E. Todd. 1900. 34 pp., 19 pls.
WS 53. Geology and water resources of Nez Perces County, Idaho, Pt I, by I. C. Russell. 1901. 86 pp., 10 pls.
WS 54. Geology and water resources of Nez Perces County, Idaho, Pt. II, by I. C. Russell. 1901. 87-141 pp.
WS 55. Geology and water resources of a portion of Yakima County, Wash., by G. O. Smith. 1901. 68 pp., 7 pls.
WS 57. Preliminary list of deep borings in United States, Pt. I, by N. H. Darton. 1902. 60 pp.
WS 59. Development and application of water in southern California, Pt. I, by J. B. Lippincott. 1902. 95 pp., 11 pls.
WS 60. Development and application of water in southern California, Pt. II, by J. B. Lippincott. 96-140 pp.
WS 61. Preliminary list of deep borings in United States, Pt. II, by N. H. Darton. 1902. 67 pp.
WS 67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls.
B 199. Geology and water resources of the Snake River Plains of Idaho, by I. C. Russell. 1902. 192 pp., 25 pls.
WS 77. Water resources of Molokai, Hawaiian Islands, by Waldemar Lindgren. 1903. 62 pp., 4 pls.
WS 78. Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell. 1903. 53 pp., 2 pls.

The following papers also relate to this subject: Underground waters of Arkansas Valley in eastern Colorado, by G. K. Gilbert, in Seventeenth Annual, Part II; Preliminary report on artesian waters of a portion of the Dakotas, by N. H. Darton, in Seventeenth Annual, Part II; Water resources of Illinois, by Frank Leverett, in Seventeenth Annual, Part II; Water resources of Indiana and Ohio, by Frank Leverett, in Eighteenth Annual, Part IV; New developments in well boring and irrigation in eastern South Dakota, by N. H. Darton, in Eighteenth Annual, Part IV; Rock waters of Ohio, by Edward Orton, in Nineteenth Annual, Part IV; Artesian well prospects in the Atlantic Coastal Plain region, by N. H. Darton, Bulletin No. 138.

Series P—Hydrographic Progress Reports.

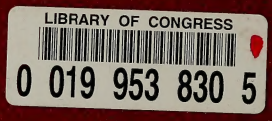
Progress reports may be found in the following publications: For 1888-89, Tenth Annual, Part II; for 1889-90, Eleventh Annual, Part II; for 1890-91, Twelfth Annual, Part II; 1891-92, Thirteenth Annual, Part III; for 1893 and 1894, Bulletin No. 131; for 1895, Bulletin No. 140; for 1896, Eighteenth Annual, Part IV, WS 11; for 1897, Nineteenth Annual, Part IV, WS 15, 16; for 1898, Twentieth Annual, Part IV, WS 27, 28; for 1899, Twenty-first Annual, Part IV, WS 35-39; for 1900, Twenty-second Annual, Part IV, WS 47-52; for 1901, WS 65, 66, 75.

PAPERS RELATING ESPECIALLY TO GENERAL HYDROGRAPHIC INVESTIGATIONS.

SERIES M—GENERAL HYDROGRAPHIC INVESTIGATION.

WS 56. Methods of stream measurement. 1901. 51 pp., 12 pls.
WS 64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls.
WS 76. Observations on the flow of rivers in the vicinity of New York City, by H. A. Pressey. 1902. 108 pp., 13 pls.
WS 80. The relation of rainfall to run-off, by George W. Rafter. 1903. 104 pp., 23 pls.
WS 81. California hydrography, by J. B. Lippincott. 1903. -- pp., 1 pl.

Correspondence should be addressed to
The DIRECTOR,
UNITED STATES GEOLOGICAL SURVEY,
WASHINGTON, D. C.


LIBRARY OF CONGRESS
0 019 953 830 5